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ABSTRACT

This manual helps service care providers working with HIV-infected people learn how HIV affects the body's major systems, emphasizing the structure and functions of each system and direct and indirect effects of HIV on each system. The curriculum was developed for case management assistants (CMAs) who work in homes of HIV-infected people. Lessons are written at the level of the high school graduate with basic knowledge of biology and anatomy. It assumes that the CMAs have completed basic training for home health aides and have at least 6 months of home care experience. Lesson plans include: the structure and function of the human cell; structure and function of the immune system; HIV overview; the respiratory system and OIs; HIV and the lymphatic system, circulatory system, nervous system, skin, and digestive system; nutrition and HIV; special concerns of women and HIV; and infants, children, and HIV. Appendixes include a quiz answer guide; glossary of terms; explanations of universal and secondary health precautions; infection control recommendations; HIV disease progression; chart of common HIV-related disorders; signs and symptoms of AIDS-related disorders; and solutions to nutritional problems common to AIDS. (SM)

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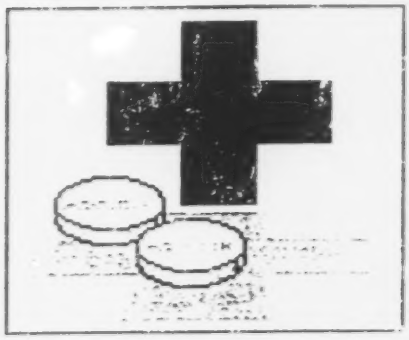

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December 1997

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Medical Training Skills Curriculum
for
Case Management Assistants

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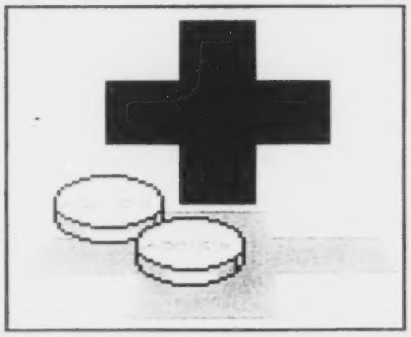

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ABOUT THIS MANUAL:

This manual has been produced in a loose leaf binder format. This makes it easy to remove and photocopy handouts, quizzes, and student guides. It also allows an instructor to easily add supplemental material s/he deems appropriate. Finally, an instructor may choose to organize the manual as s/he sees fit. We have followed each lesson plan with its quiz and student guide. Others may prefer to have all the quizzes and student guides in their own sections. An instructor should feel free to make this manual his/her own.

ABOUT THIS CURRICULUM:

GOAL OF THE CURRICULUM:

This manual is designed to help service care providers working with HIV infected people learn how HIV affects the body's major systems. Special emphasis is given to the structure and functions of each system, and the direct and indirect affects HIV has on each system. With this understanding, service care providers will be better able to recognize and address symptoms and situations that may adversely affect persons with AIDS (PWAs), and also teach consumers to recognize and address those issues on their own. Early intervention in these areas should improve the quality of life of PWAs.

For those instructors who wish to incorporate practical aspects of "living with HIV" into this curriculum, we suggest using Nick Siano's text *No Time To Wait* as a compliment to this manual. While we focus primarily on anatomy, physiology, and affects of HIV infection, *No Time To Wait* provides more on the day-to-day aspects of living with complications of HIV infection. Especially with an audience of Case Management Assistants, this complimentary information may help frame the more biological/technical information contained in this manual, and provide practical applications and illustrations of how one can effectively deal with the complications of HIV infection. We have included chapters from *No Time To Wait* as supplemental reading for many of these lessons.

TARGET AUDIENCE:

This curriculum was developed specifically for Case Management Assistants (CMAs). This position is equivalent to a home health aide. Specifically, CMAs work in homes where one or more family members are HIV infected. The lessons are written for comprehension of a high school graduate with basic (high school) knowledge of biology and anatomy. The curriculum also assumes that the CMAs have completed the basic training for home health aides and have at least six months of home care experience. See the next section for suggestions about how this curriculum can be adapted to other audiences.

ALTERING THIS CURRICULUM FOR DIFFERENT AUDIENCES:

Although specifically written for CMAs, we have designed this curriculum to be flexible in the hopes that, with minimal alterations, it may meet the needs of different HIV service care providers. The following are suggestions for how to use this curriculum with two different audiences:

For Nurses or Other Medical Professionals:

Most medical professionals will have studied the human cell extensively, and some may have studied the human immune system. As such, lessons 1 and 2 can be skipped, or used simply as a review tool. Lesson 3, however, should be completed in full, as many medical professionals have not had detailed instruction in the workings of HIV. Medical professionals who have had extensive training in anatomy and physiology may not need to study the first sections of lessons 4-10 (i.e., structure/function of the system), but the affects of HIV on the body's systems should be thoroughly covered. Concentration on signs and symptoms, diagnosis, and treatment is suggested. Finally, unless medical professionals have had experience working with HIV infected women and children, lessons 11 and 12 should be used in full.

For Case Managers or other Non-clinical Service Care Providers:

ActionAIDS presented this curriculum to its case management staff with much success. All of the lessons were used, although a slightly different focus was taken than with CMAs. While the structure and function of each of the body's systems were reviewed, more emphasis was placed on HIV's affects on these systems and various warning signs that might signal the onset or presence of a serious medical issue. Focus was also placed on helping case managers more comfortably talk with health professionals and to answer client's questions regarding medical terminology, medications, and diagnostic tests.

STRUCTURE OF THE OVERALL TRAINING:

The curriculum, as originally presented to CMAs, involved 12 sessions, 1 per week, each lasting 4 hours. During each 4 hour class, one lesson was taught and one quiz was given. There was at least one break included in each session.

{When the training was presented to case managers at ActionAIDS, it involved 8 sessions, 1 per week, each lasting for 2 hours. Several sessions required that 2 lessons be taught. Evaluations consistently reflected that a case manager's ability to accommodate this pace was directly related to the baseline knowledge and work experience with PWAs. It is very important, whenever possible, to group students according to existing knowledge of HIV progression.}

It is imperative that students attend all lessons in full, since each has a logical progression. For example, in the body system lessons (lessons 4-10), there is a progression from the structure/function segment to the segment detailing the affects of HIV on the system.

It is imperative that the facilitator present all lessons in their proper order, since early lessons provide information that will be built upon and expanded in later lessons. This is most important during the first three lessons, where all the foundation material for the other 9 lessons is provided.

Missed lessons should be made up as soon as possible, preferably before students progress to the next lesson. The lessons should not be taught out of order.

This curriculum was presented by a registered nurse who had extensive experience with both anatomy and physiology, and HIV related disorders. A medical professional with similar qualifications or an educator with knowledge in these areas would be appropriate instructors for this curriculum. It is not recommended that educators or medical professionals with little experience in HIV related disorders teach this curriculum, as this experience is essential in helping an instructor answer questions and clarify issues that may arise.

TEACHING METHODOLOGY:

A loose lecture format was used throughout this curriculum. Due to the amount of information presented in a relatively short period of time, this methodology was deemed most appropriate. Questions and comments were encouraged by the instructor throughout the lesson, and often the class resembled a discussion more than a standard lecture. Students were encouraged throughout the course to make connections between their experiences "in the field" and the material being presented. While the lesson provided the formal information, the students themselves often provided the practical application and examples.

Instructors are encouraged to make use of their own experiences, and examples when presenting the curriculum's content to a class. For example, the instructor used stories from her own vast experience as a nurse to further illustrate points and explain how HIV related disorders might manifest. She would also often present hypothetical situations to the class, based on the information presented (e.g., "What would you do if you came upon this situation..."). These examples are not included, as they were often spontaneously generated by the instructor and, although relevant to the CMAs, they may not be appropriate for all student groups. When presenting the curriculum to case managers, the instructor created scenarios centering around home visits and office visits (e.g., "As you are talking to a client in your office, you notice the following symptoms..." "What questions might you ask?" "What action might you take?"). Because each instructor, and each audience, will be unique, instructors preparing to use this curriculum should carefully select examples, stories, and illustrations that will tie the material presented in the lesson more closely to the population being served. Although it is certainly possible to simply present the information as listed in the lesson plan, an instructor can make the information come alive by using examples drawn from his/her own experiences and the experiences of his/her students.

Each instructor ultimately will have to select the methodology he/she is more comforatable with for doing the presentation.

MATERIALS NEEDED:

The following is a list of common supplies that may be used at every lesson. Each lesson plan also lists specific materials needed (e.g., handouts, diagrams, medical equipment). All supplies should be obtained before the first lesson is taught since this avoids the problem of suddenly realizing you are without something necessary to the successful completion of a lesson.

General supplies needed for all lessons include:

- chalk board, dry erase board, or newsprint pads
- markers
- masking tape
- pens and pencils
- paper for taking notes (if students do not have notebooks)

Lesson plan
Student guides
Lesson quiz

NEEDS ASSESSMENT / PRE and POST TESTING:

In order to use this curriculum effectively, and assess the benefits of this curriculum on students' learning, it is important to assess students' knowledge level at the outset. Students who have had extensive schooling in anatomy and physiology, or HIV, may not be appropriate audiences for this curriculum.

The instructor may easily create a pre-test by taking a sample of questions from each chapter quiz. Students who excel on this pre-test may have already met the learning objectives of the curriculum.

In the same way, this pre-tests can be used as a post-test at the end of the curriculum. By utilizing the same pre and post test, instructors can gauge how much learning has taken place during the course.

A "final exam" can also be constructed by taking a sampling of questions from each chapter quiz.

ABOUT THE LESSONS, QUIZZES, AND STUDENT GUIDES:

STRUCTURE OF THE LESSONS:

There are 12 lessons in this curriculum. Each is designed to meet the overall goal of helping service care providers learn how HIV affects all of the body's major systems. The lesson plans are divided into 3 sections:

- Lessons 1-3 provide background, or foundation, information needed before a review of the body's systems can be undertaken. Lesson 1 details the structure and function of the human cell, the building block of all the body's systems. Lesson 2 details the structure and function of the immune system. Lesson 3 provides basic information about HIV.

- Lessons 4-10 provide a review of the body's major systems and HIV's affects on these systems. The basic structure and function (anatomy and physiology) of each system are presented, along with a discussion of the direct and indirect affects HIV has on each system. A detailed chart of HIV related opportunistic infections is provided for each of the body's systems

- Lessons 11-12 highlight how HIV affects two special populations: women and infants/children. Since these populations experience different manifestations of HIV, different opportunistic infections, and require different approaches to health management, we felt it important to discuss these populations separately.

STRUCTURE OF LESSON PLANS:

Each lesson plan is structured the same way:

- The **rationale** explains why this lesson should be taught, and why it is included in this curriculum.

- The **goals and objectives** spell out the educational aims for each lesson, including what concrete behaviors students should be able to achieve at the completion of each lesson.

- The **materials needed** section details what specific handouts, equipment, etc.. are needed to conduct this lesson.

- The **key terms** section lists the medical and/or technical vocabulary presented in each lesson. Students should be able to define all of these terms by the end of the lesson.

- The **process** section contains the content for each lesson. An introductory section sets the stage for the more technical, medical information. The lecture section lays out this technical, medical content in outline form. This allows the instructor to choose the level of detail s/he wants to present to a class. The facilitator went through all of the content presented. Others who use this manual may feel the need to go into less detail. By focusing on the major sections of the outline (e.g., roman numerals, capital letters, cardinal numbers) and deleting, or limiting the coverage of, the minor sections of the outline (e.g., small letters, numbers in parentheses), an instructor can choose to present the major points of information without further detail. Altering the content in this way provides a cursory, rather than an in-depth view of the material. Throughout, we have included analogies designed to make explaining medical information easier. We also have included notes to the instructor to clarify and add supplementary information to the lesson. These analogies and notes are contained in ***[square brackets, italics, and bold].*** The instructor may share this information with the class at his/her discretion. We do strongly urge sharing the analogies with the class, as we found them very useful in helping students grasp and remember complex anatomical concepts.

- The **handout** section, included in some lesson plans, suggests the handouts in the curriculum's Appendix to students.

- The **evaluation** section details what methods were used to gauge how much the students learned from each lesson. In all cases, this was gauged by the lesson quiz, although other instructors may choose alternate means of evaluation.

- The **supplemental activities** section, included in some lesson plans, lists reading, *No Time to Wait* (refers only to *No Time to Wait)*, handouts/skills/materials instructors may use to reinforce, compliment, and/or move beyond the basic materials presented in a lesson. Instructors may choose to incorporate any, all, or none of these supplemental activities into a lesson plan. The lessons are designed to stand alone; the supplemental activities offer opportunities for adding more depth and breadth to the information.

LESSON QUIZZES:

A quiz is provided for each lesson. These quizzes are designed to test whether or not students have retained important information presented during the lesson. Each quiz has 2 sections: there are true and false questions followed by short answer questions. These two different styles are utilized to ensure that students with different learning and test taking strengths will be accommodated.

There are many ways to make use of the quizzes. Some instructors will choose to give the quizzes at the conclusion of a lesson. Others will choose to begin a lesson with a quiz on the previous lesson's material. Some instructors may choose to add questions to the lesson quizzes, based on additional information they included in a lesson. Finally, some may choose not to use them at all. The use of the quizzes is entirely at the discretion of the instructor.

An answer guide for the quizzes is provided in the Appendix.

STUDENT GUIDES:

We have included student guides for each lesson in this curriculum. These guides are designed to give students an overview of the lesson. The lesson's rationale, objectives and key terms are included exactly as they appear in the lesson plan itself. The process section has been culled down to a basic outline of the content to be presented. It is our aim here only to show students the major topics to be presented in this lesson, and the order in which they will be presented.

These student guides can be used before, during, or after a lesson.

Before a lesson:

The guides may be used as lesson previews. They can be distributed the week prior to a lesson, allowing students to look over and familiarize themselves with the objectives, concepts, and vocabulary to be covered in the next lesson. Looking up the lesson's key terms before coming to class may help students prepare for the lesson.

During a lesson:

If distributed at the time a lesson is presented, the guides give students an outline of how a particular lesson will flow, and what material will be covered. Students may take their class notes on the lesson guides, fleshing out the content outline as the lesson progresses.

After a lesson:

The guides may be used as a review tool after a lesson. Students may use them to study the lesson's content in preparation for an upcoming lesson quiz. The guides provide the major concepts covered, so students can also test their knowledge by trying to "fill in" the remainder of the information presented in the lesson from memory.

As with the lesson quizzes, instructors should use the students guides as they deem most appropriate.

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STRUCTURE AND FUNCTION OF THE NORMAL HUMAN CELL

RATIONALE:

The cell is the basic unit of life. A human being is made up of trillions of cells, each performing a specific job which results in the health and well being of an individual. Human Immunodeficiency Virus (HIV) affects the body at the cellular level; individual cells are infected and their functions are impaired. Once health at the cellular level has been affected, the overall health of the individual is threatened. Service care providers who possess a basic understanding of the structure of the human cell, its normal operations, and conditions that interfere with a cell's normal operations will be better able to serve HIV infected clients because they will have a more complete understanding of the complexity of a symptom, infection, or disease.

GOALS:

1. Students will learn the structure and function of the normal human cell.

2. Students will examine how choices regarding the quantity and quality of air, water, and nutrients affect the functioning of the human cell.

OBJECTIVES:

At the completion of this lesson, students will:

1. have learned the definitions of the lesson's key terms, so that they can correctly identify and/or define those terms presented on the chapter quiz.

2. identify the three essential elements that every human cell requires in order to maintain its health and integrity as air, water, and nutrition.

3. learn the names and functions of the 12 organelles presented in this lesson, so that they can correctly identify and/or list the function of those organelles presented on the chapter quiz.

4. correctly list 5 or 6 of the situations discussed in class which can result in cells not being able to effectively perform their jobs.

MATERIALS NEEDED:

General supplies needed include:

- chalk board, dry erase board, or newsprint pads
- markers
- masking tape
- pens and pencils
- paper for taking notes (if students do not have notebooks)

Lesson plan
Student guide
Lesson quiz
Appendix B: Glossary of Terms

KEY TERMS:

cell membrane	cytoplasm	golgi complex
health	illness	lysosome
microtubule	mitochondria	nuclear membrane
nucleolus	nucleoplasm	organelle
reticulum	ribosome	vacuoles

PROCESS:

Introduction:

The cell is the foundation of every function the human body achieves. Health means cells are functioning correctly. Illness means cells are not functioning correctly. When the correct functioning of the normal human cell is understood, health can be enhanced and illness can be limited. It is for these reasons that we begin our study of health issues related to individuals living with HIV/AIDS by studying the human cell.

Lecture:

[NOTE: It may be helpful to use a diagram of a cell and point out organelles as they are described.]

I. The cells in the body are always working, 24 hours a day, 7 days a week.

II. The way the cells operate together to produce a healthy, functional body can be compared to a well run factory. A factory takes in raw materials and produces a product. Think of the cell as a tiny factory. The critical raw materials our cells take in are: air, water, and nutrients. Using these materials, the cells "produce" a healthy body (or a part of a healthy body).

A. Our choices of the quality and quantity of air, water, nutrients, drugs and alcohol (including nicotine), etc., affect how well our cellular factories run.

[A factory has many vendors available from which it can get its raw materials. It is the job of the factory's management to make choices regarding the cost and quality of the raw materials that are imported.]

B. Our cells are designed to operate at maximum potential and efficiency.

[The goal of every factory is to produce a perfect product the first time around without wasting any time or materials.]

C. An organelle is a component of a cell. Cells contain different numbers of each type of organelle depending on the primary function of that cell. For example, muscle cells have higher numbers of mitochondria and ribosome; digestive system cells have high amounts of lysosomes, golgi complex and vacuoles. The primary organelles within a human cell are as follows:

[A factory can have many different departments. Each factory may have different departments, or different sized departments, based on what kind of factory it is.]

1. Cell Membrane: This is the "skin" or protective shield of a cell. It is a semi-permeable membrane, allowing nutrients in and products (depending on the function of the cell) and waste products out.

[In a factory, the cell membrane would be the walls of the building including the loading docks where shipping and receiving take place according to orders from the management.]

2. Nucleolus: This is the "brain" of the cell where RNA and DNA (genetic material) are contained. The nucleolus controls cell division and all major operations of the cell. As we will see in later lessons, HIV affects this part of a cell.

[This is the management or Board of Directors (the decision makers) of the factory.]

3. Nuclear Membrane: This is the "skin" or protective shield of the nucleolus. It is a semi-permeable membrane, allowing nutrients in, and enzymes (which give the cell orders) and waste products out of the nucleolus.

[In our factory, this is the walls surrounding the bosses office and the communication system between management and the factory employees.]

4. Nucleoplasm: This is the gelatinous fluid within the nucleolus in which the genetic material floats.

[This is the working space of the management and the means by which one manager in the factory communicates with another manager.]

a) Cytoplasm: This is the gelatinous fluid within the cell in which the organelles float.

[This is the working space in the factory where products are assembled and the means by which one factory worker communicates with another.]

5. Ribosome: These produce proteins used for the work and repair of the cell.

[This is the factory department that handles internal repairs and maintenance of equipment.]

6. Reticulum: This transports proteins made by the ribosome. It also transports special cell products like steroids, enzymes, and calcium products within the cell.

[In our factory, this is the internal transportation system that moves components between departments.]

7. Golgi complex: These store secretary materials for cell use or export.

[In our factory, these are simply the storage systems for all products for export or internal use.]

8. Mitochondria: Using oxygen (O2) and dietary nutrients, these produce all of the body's energy. Water (H2O) and carbon dioxide (CO2) are the by-products of the mitochondria's work.

[This is the factory's internal power plant or energy converter system. Its what converts external energy for internal use as needed by the factory.]

9. Vacuoles: These are sacs that move products within the cell, as well as in and out of the cell.

[This is the factory's shipping department, transporting products to and from the loading docks.]

10. Lysosome: This organelle contains enzymes which break down foreign objects and cellular by-products.

[This is the factory's housekeeping department which cleans up and disposes of waste.]

12. Microtubule: These are protein tubules (little tubes) which provide structure to the cell.

[These are the support beams of the factory.]

D. In order for a human being to be healthy, cells must have all the right working parts that function correctly all the time.

[In order to achieve maximum product production in the factory, all raw materials must be available in the correct quantity and quality all the time, and all factory departments must be the right size and functioning properly.]

E. There are many things that can result in our cells not functioning at peak efficiency. Most of these have to do with our not getting a balanced intake of air, water or food and failure to avoid drugs and alcohol, preservatives, additives, simple sugar, saturated fats, and caffeine. Here are some of the things that can compromise the normal operation of our cells:

1. Skipping meals, crash diets, strenuous exercise prior to adequate food an fluids.

[In our factory, this would be like products not arriving on time. Production will slow and eventually stop.]

2. Not eating a well balanced diet or not drinking adequate water.

[Products arrive in the wrong quantities (too much of some things, not enough of others). The factory cannot produce a good product.]

3. Consuming "junk food", improperly prepared food, over-processed food, too many with additives and preservatives.

[If defective products arrive at the factory, a good product cannot be produced.]

4. Inadequate water intake results in dehydration. All cellular functions are slowed and sometimes stop.

[In our factory, this would be like all the transportation systems breaking down.]

5. Organelles can become weakened due to inadequate water, food, and O2.

[Factory workers get sick.]

6. Because the cell's main goal is to continue to function, organelles will use the best of what is available in order to maintain cellular function, even if the best is defective or inferior.

[In our factory, this would be like installing defective parts into the product just to "keep things moving".]

7. High stress, disease, infection, sudden increase in exercise, long-term malnutrition can all cause a depletion of resources, shut-down of cell functioning, and even cell death.

[Sometimes a factory order cannot be filled due to inadequate parts of workers.]

8. The body maintains a priority system when allocating resources. With inadequate resources, the body will divert resources to the highest priority areas (e.g., the brain, lungs, heart, liver, kidneys). As a result, other "non-vital" systems (e.g., muscles, teeth, bones, skin, etc...) become weak and cell death may occur in these areas.

[When the factory has limited resources, some workers must be laid off.]

HANDOUTS

Appendix B: Glossary of Terms

EVALUATION

Student quiz.

SUPPLEMENTAL ACTIVITIES

Reading, No Time to Wait: Chapters 1 **Structure and Function of the Normal Human Cell**

Handouts/Skills/Materials:

Poster/Handout of The Human Cell (not included)

STRUCTURE AND FUNCTION OF THE HUMAN CELL

Name: _____ Date: _____

PART I - True or False

Directions: Read each statement carefully. In the space provided, write the word "True" if the statement is true, or write the word "False" if the statement is false

_____ 1. The three essential elements our cells need to function properly are air, water, and nutrients.

_____ 2. The nucleolus is the energy producing "power plant" of the cell.

_____ 3. Cytoplasm is the gelatinous fluid in which organelles float.

_____ 4. The lysosomes contain enzymes which break down foreign objects and cellular by-products.

PART II - Short Answer

Directions: Read each item carefully. In the space provided, write a brief answer that addresses all aspects of the question.

5. Briefly define the following key terms from this lesson:

a) health: _____
_____

b) illness: _____
_____

c) organelle: _____
_____

6. Name and briefly explain three (3) situations that can result in cells not being able to perform their jobs effectively.

a) _____

b) _____

c) _____

STRUCTURE AND FUNCTION OF THE NORMAL HUMAN CELL

WHY STUDY THE CELL:

The cell is the basic unit of life. A human being is made up of trillions of cells, each performing a specific job which results in the health and well being of an individual. HIV affects the body at the cellular level; individual cells are infected and their functions are impaired. Once health at the cellular level has been affected, the overall health of the individual is threatened. Service care providers who possess a basic understanding of the structure of the human cell, its normal operations, and conditions that interfere with a cell's normal operations will be better able to serve HIV infected clients because they will have a more complete understanding of the complexity of a symptom, infection, or disease.

LESSON OBJECTIVES:

At the completion of this lesson, students will:

1. have learned the definitions of the lesson's key terms, so that they can correctly identify and/or define those terms presented on the chapter quiz.

2. identify the three essential elements that every human cell requires in order to maintain its health and integrity as air, water, and nutrition.

3. learn the names and functions of the 12 organelles presented in this lesson, so that they can correctly identify and/or list the function of those organelles presented on the chapter quiz.

4. correctly list 5 or 6 of the situations discussed in class which can result in cells not being able to effectively perform their jobs.

KEY TERMS:

cell membrane	cytoplasm	golgi complex
health	illness	lysosome
microtubule	mitochondria	nuclear membrane
nucleolus	nucleoplasm	organelle
reticulum	ribosome	vacuoles

LESSON CONTENT (SUMMARY):

Introduction:

The cell is the foundation of every function the human body achieves. Health means cells are functioning correctly. Illness means cells are not functioning correctly. When the correct functioning of the normal human cell is understood, health can be enhanced and illness can be limited. It is for these reasons that we begin our study of health issues related to individuals living with HIV/AIDS by studying the human cell.

Content Outline:

The cells in the body are always working, 24 hours a day, 7 days a week.

The way the cells operate together to produce a healthy, functional body can be compared to a well run factory. A factory takes in raw materials and produces a product. Think of the cell as a tiny factory. The critical raw materials our cells take in are: air, water, and nutrients. Using these materials, the cells "produce" a healthy body (or a part of a healthy body).

Our choices of the quality and quantity of air, water, nutrients, drugs and alcohol (including nicotine), etc... affect how well our cellular factories run.

Our cells are designed to operate at maximum potential and efficiency.

An organelle is a component of a cell. Cells contain different numbers of each type of organelle depending on the primary function of that cell. The primary organelles within a human cell are as follows:

1. cell membrane
2. nucleolus
3. nuclear membrane
4. nucleoplasm
5. cytoplasm
6. ribosome
7. reticulum
8. golgi complex
9. mitochondria
10. vacuoles
11. lysosome
12. microtubule

B. In order for a human being to be healthy, cells must have all the right working parts that function correctly all the time.

C. There are many things that can result in our cells not functioning at peak efficiency.

The medial training has had a positive impact in my personal life as well as in my professional life. My husband - a heavy smoker, and who eats a great deal of pork - informed me one day when I returned from work that he had been experiencing terrible headaches for two days. I took my husband's blood pressure and found it to be very high. His systolic was 180 and his diastolic was 95, which reads 180/95. I encouraged my husband to visit his doctor and he was put on medications to lower his pressure. If I had not taken this training, my husband may have had a stroke.

Angela Barnes
Case Manager Assistant
ActionAIDS

STRUCTURE AND FUNCTION OF THE IMMUNE SYSTEM

RATIONALE:

The immune system protects the human body from foreign invaders such as bacteria, viruses, fungi, and abnormal cells, which impair the healthy functioning of the human body. The Human Immuno-deficiency Virus (HIV) attacks and disables the human immune system. When this happens, an HIV infected individual has greatly reduced abilities to fight off foreign invaders. This can seriously compromise the health of the individual. In order to understand the way HIV compromises the human immune system, we must first understand the normal functioning of the immune system. With a basic grasp of the way this system functions in normal circumstances, we can more easily understand the way HIV perverts this functioning. Service care providers working with HIV infected individuals must have a basic understanding of the immune system if they hope to aid consumers with the many realities of their lives, including opportunistic infections, medications, symptoms, etc.

GOAL:

Students will learn the basic structure of and function of the human immune system.

OBJECTIVES:

At the completion of this lesson, students will:

1. have learned the definitions of the lesson's key terms, so that they can correctly identify and/or define those terms presented on the chapter quiz.

2. given the name of any of the 3 levels of immune defense, write a sentence that correctly summarizes the purpose of that level of defense.

3. given the name of any of the 3 levels of immune defense, list the various cells and organs involved in this system of defense.

4. given the name of a cell or organ and the level of defense it is involved in, correctly identify the function of that cell/organ.

MATERIALS NEEDED:

General supplies needed include:

- chalk board, dry erase board, or newsprint pads
- markers
- masking tape
- pens and pencils
- paper for taking notes (if students do not have notebooks)

Lesson plan
Student guide
Lesson quiz
Appendix C: When to Ware Gloves
Appendix D: Secondary Health Precautions

KEY TERMS:

antibody	antigen	B cell
bone marrow	cilia	extracellular space
general host defense	inflammatory process	leukocyte
lymph node	lymphocyte	macrophage
normal flora	protective surface phenomena	spleen
specific immune response	T4 cell	T8 cell
thymus		

PROCESS:

Introduction:

The immune system is designed to recognize, respond to, and eliminate foreign substances. We call any substance that is foreign to the human body an antigen. The body is exposed to many antigens at any given moment, and the immune system has different methods for handling each situation. The immune system also preserves the body's internal environment by scavenging dead and damaged cells.

The functioning of the immune system is very complex. It is made up of different types of white blood cells (WBCs) ***[NOTE: WBCs are also known as leukocytes]***, the lymphatic system, and many organs (e.g., the thymus, spleen, and bone marrow). This system has many back-up systems, more than any other function of the body. This is because fighting infection is critical to the survival of the human organism.

The three separate levels of defense in the immune system are the:

- Protective Surface Phenomena
- General Host Defense
- Specific Immune Response

In addition to these levels of defense, the immune system has a clean-up function designed to deal with the residual products of destruction following an immune response. This final phase of immune system activity allows the body to re-establish readiness for the next assault on the immune system.

Lecture:
[NOTE: The levels of defense used by the immune system can be compared to the strategies an army uses in war]

I. The Protective Surface Phenomena

A. The body's first line of defense against invasion by antigens.

B. This level works primarily as a barrier to entry.

C. It involves the skin, respiratory and gastrointestinal (GI) systems.

1. Skin: the largest area of exposure to invasion

a) Acts as a shield to entry. The only vulnerable sites of entry into the body when skin is intact are the mouth, nose, anus, urethra and, in women, the vagina.

b) The pH of the skin is low which discourages attachment and growth of micro-organisms.

2. Respiratory System: antigens are in every breath we take, from micro-organisms to chemical pollutants such as carbon monoxide (produced by cars).

a) Mucous membranes contain and secrete an antibacterial substance.

b) Mucous lines the entire respiratory system and is difficult to permeate. Antigens can get trapped in the mucous.

c) Cilia are tiny hair-like projections from some cells that beat back and forth to assist in fluid movement. The ciliary movement pushes mucous, and trapped antigens, up-ward and out of the respiratory system. Mucous (containing the antigens) are also eliminated through coughing and sneezing.

3. Gastrointestinal System: everything we eat or drink is processed in our GI system. ***[NOTE: see digestive system lesson for more details.]*** Many organisms, additives, and preservatives in food need to be prevented from entering the blood stream.

a) Saliva and gastric secretions are antibacterial.

b) There are bacteria and fungi in the GI system that are normally present. These normal organisms, called normal flora, help to prevent colonization of other organisms.

[The protective surface phenomena compares to the "front line" soldiers intent on blocking enemy entry. They are the largest force, face the most enemy encounters, and are equipped with a variety of weapons that can be used for different enemy attacks. They have the highest turnover rate due to loss and burn out.]

II. The General Host Defense

A. This secondary line of defense is turned on whenever an antigen succeeds in penetrating the first line of defense.

1. the primary goal here is to contain the antigen in the smallest possible area.

2. this is done by setting up a wall around the site of penetration, through a process known as "inflammation".

a) blood supply is increased at the site of penetration to allow all possible WBCs (leukocytes) to get to the site and surround the antigen.

b) this causes heat, redness, swelling, tenderness in the area.

3. also, a chemical alarm is sent to alert the immune system that an antigen has passed the protective surface level.

4. examples of when the inflammatory process would be set up include:

a) bacteria entering the tissue following a cut in the skin.

b) air pollutants entering the blood stream through the lungs.

c) bacteria entering the blood stream through the intestinal wall.

B. The cells and organs involved in this level of defense include:

1. macrophage: any type of WBC that can detect, engulf, and break down antigens (a process called phagocytosis). Macrophages are scavenger cells.

a) they can tell what is a natural part of an organism (person) and what is not, but they cannot differentiate one antigen from another.

b) they set up the inflammatory process when an antigen is identified. The inflammatory process is the same regardless of the invader.

c) after breaking down antigens, macrophages send a chemical message, like a blueprint, to the T4 cells. The T4 cell uses this blueprint to identify the specific make-up of the antigen.

a) this chemical message ultimately calls specific antibodies to the site

[NOTE: see the next section for more details.]

2. Bone marrow:

a) produces all WBCs (there are five different types) according to the body's demand.

b) stores some WBCs to be released on demand by the immune system

c) through producing and releasing of WBCs, the bone marrow can double the number of WBCs in circulation within hours of the initiation of the inflammatory process.

[The general host defense compares to the army's "secondary" troops. These are fewer of these troops. They serve two functions: they always have some troops on patrol looking for enemy invaders missed by the front line, and they are also always ready to respond if the front line radios that there has been enemy penetration. These troops come immediately to the site of attack with tanks and heavy guns.]

III. The Specific Immune Response

A. The functions of this level of immune response are to:

1. react to a specific antigen.

2. identify whether the antigen is a familiar one or one that is new to the body.

3. produce specific antibodies to destroy specific antigens.

4. keep the immune response active until the antigen is destroyed.

5. induce the production and release of lymphocytes (a type of WBC responsible for the specific immune response).

6. turn off the process when the antigen is destroyed.

B. The cells and organs involved in this level of defense include:

1. T4 cells (also known as CD4 cell, inducer cells, or T helper cell)

a) this is the "master mind" of the immune system.

b) characteristics:

(1) are made as T cells in the bone marrow.

(2) mature and become specialized into T4 cells in the thymus.

(3) live for years, under normal conditions.

(4) receive the blueprint information about the antigen from the macrophage.

(5) determine if the antigen is old or new.

(6) keep this information in memory.

(7) constantly circulate in the bloodstream, the lymph system, and in spaces between cells (called the extracellular space).

(8) stored in the lymph nodes when not involved in an active immune response.

c) if a T4 cell encounters a familiar antigen:

(1) a chemical message is released from T4 cells to attract the antibodies specific to this antigen. These antibodies already exist due to prior infection and creation of antibodies to the antigen (immunity).

(2) this secondary response starts in minutes and reaches an affective level within 1-2 days.

d) if a T4 cell encounters a new antigen:

(1) the T4 cell sends a chemical blueprint to the cells and organs responsible for producing new antibodies.

(2) this process can take 4-10 days to reach an affective level of antibody response.

(3) after this, the T4 cells will remember the antigen and will keep some antibodies against this antigen in storage. The body will be considered immune to this substance for life.

(4) the T4 cell also monitors the antigen fighting process, and when it is under control, sends a message to the cells responsible for stopping the process.

e) T8 cells (also known as CD8, T suppressor cell, or killer cell):

(1) are responsible for turning off this level of defense.

(2) are capable of performing the activities of the T4 cell when needed (as seen in AIDS).

(3) characteristics:

(a) they are made as T cells in the bone marrow.

(b) mature and become specialized into T8 cells in the thymus.

(c) live for years under normal conditions.

(d) send enzymes messages to attract additional B cells to the antigen site.

(e) receive enzyme messages from the T4 cell to turn off the immune response.

2. B cells:

a) are also lymphocytes.

b) create and store antibodies which neutralize specific antigens.

[NOTE: T cells and B cells collectively are called lymphocytes.]

3. antibodies:

a) are a substance created to neutralize a specific antigen.

b) these are stored in the B cell.

4. bone marrow:

a) responds to this level of defense by producing lymphocytes (T4, T8, B cells) and macrophage cells on an as-needed basis.

b) produces all WBCs on an ongoing basis to keep the entire body in "a state of readiness."

5. thymus:

a) produce some B cells.

b) stores T cells and stimulates their maturity and specialization into T4 or T8 cells.

c) is thought to play a strong part in the retaining memory of antigens known as immunity. This process is still not completely understood.

6. spleen:

a) stores T4 & B cells.

b) responds to the chemical signals of the T4 cell and releases the proper type and quantity of cells needed to respond to each specific invasive situation.

[The specific immune response compares to several different types of specialized forces:

The special attack forces (B cells and antibodies) have training in the use of target specific missiles. They receive enemy location information from the secondary troops and fire accordingly.

The command forces (T4 cells) have responsibility for knowing the situation of all the troops. They receive all of the status reports and activate the number and level of troops needed. The command force also reports to the army generals (brain, bone marrow, and thymus) to request specific numbers and level of replacement troops
The command force (T8 cells) also call the troops back to camp as the battle winds down]

IV. The Immune System Also Contains A Clean-Up Function

A. An aggressive immune response results in many damaged WBCs and RBCs. There are also many foreign particles in the blood stream and extracellular fluids. As a result, blood chemistry changes, and fluid and oxygen flowing in and out of cells around the site of invasion is slowed. This reduces the healthy functioning of cells and therefore interferes with the repair process. This immune system clean-up function is actually one of the first steps to repair and rebuilding following a damaging infectious process.

B. The cells and organs involved in the clean-up process include:

1. lymph nodes

a) breakdown debris circulating in the lymphatic system.

b) filter lymph fluid before it re-enters the blood stream.

[NOTE: see the lymph system lesson for a more detailed discussion.]

2. macrophages

a) engulfs the waste created by antigen destruction, and breaks it down further.

b) transports the residue into the lymph system to get it out of circulation.

3. spleen

a) filters out old and damaged WBCs and RBCs.

b) stores excess WBCs no longer needed in circulation.

4. tonsils, adenoids, Appendix:

a) the functions of these organs are not well understood

b) all are believed to be involved in the clean-up process coordination with the lymphatic system.

[As the battle concludes, and more after it is over, the command force sends in the medic and clean-up crew to ready the front line for the next attack. The clean-up crew is sent in to remove the dead bodies, damaged equipment, and recover useful supplies.]

HANDOUTS

Appendix C: When to Ware Gloves
Appendix D: Secondary Health Precautions

EVALUATION
Student quiz.

SUPPLEMENTAL ACTIVITIES
Reading, No Time to Wait: Chapter 3 & 16

Handouts/Skills/ Materials:

Not Included:

- Diagram of Lymph System
- Organizational "Infection Control Policy"
- Basic care (Use of gloves, Skin care, Mouth care, Handwashing)
- Food selection
- Infection control
- Cleaning techniques
- Identify constitutional symptoms and discuss appropriate actions

Included:

- Assess needs for health care follow-up (Appendix D)
- Discuss safe sex behavior with clients (Appendix D)
- Discuss stress management techniques with clients (Appendix D)
- Discuss infection control practices with clients (Appendix D)

STRUCTURE & FUNCTION OF THE IMMUNE SYSTEM

Name: _____ Date: _____

PART I - True or False

Directions: Read each statement carefully. In the space provided, write the word "True" if the statement is true, or write the word "False" if the statement is false

_____ 1. The immune system is designed to recognize, respond to, and eliminate foreign substances.

_____ 2. Intact skin is very vulnerable to invasion by antigens.

_____ 3. Macrophages are special white blood cells that are the "master minds" of the immune system.

_____ 4. B cells create and store antibodies

PART II - Short Answer

Directions: Read each item carefully. In the space provided, write a brief answer that addresses all aspects of the question.

5. Briefly define the following key terms from this lesson:

a) antigen: _____

b) normal flora: _____

c) leukocyte: _____

6. For each of the following levels of defense, write 1 sentence that summarizes its purpose:

a) protective surface phenomena: _____

b) general host defense: _____

c) specific host defense: _____

7. Briefly explain why it is important that the human immune response involve a clean-up function:

STRUCTURE & FUNCTION OF THE IMMUNE SYSTEM

WHY STUDY THE IMMUNE SYSTEM?:

The immune system protects the human body from foreign invaders such as bacteria, viruses, fungi, and abnormal cells, which impair the healthy functioning of the human body. The Human Immuno-deficiency Virus (HIV) attacks and disables the human immune system. When this happens, an HIV infected individual has greatly reduced abilities to fight off foreign invaders. This can seriously compromise the health of the individual. In order to understand the way HIV compromises the human immune system, we must first understand the normal functioning of the immune system. With a basic grasp of the way this system functions in normal circumstances, we can more easily understand the way HIV perverts this functioning. Service care providers working with HIV infected individuals must have a basic understanding of the immune system if they hope to aid consumers with the many realities of their lives, including opportunistic infections, medications, symptoms, etc..

LESSON OBJECTIVES:

At the completion of this lesson, students will:

1. have learned the definitions of the lesson's key terms, so that they can correctly identify and/or define those terms presented on the chapter quiz.

2. given the name of any of the 3 levels of immune defense, write a sentence that correctly summarizes the purpose of that level of defense.

3. given the name of any of the 3 levels of immune defense, list the various cells and organs involved in this system of defense.

4. given the name of a cell or organ and the level of defense it is involved in, correctly identify the function of that cell/organ.

KEY TERMS:

antibody	antigen	B cell
bone marrow	cilia	extracellular space
general host defense	inflammatory process	leukocyte
lymph node	lymphocyte	macrophage
normal flora	protective surface phenomena	spleen
specific immune response	T4 cell	T8 cell
thymus		

LESSON CONTENT (SUMMARY):

Introduction:

The immune system is designed to recognize, respond to, and eliminate foreign substances. We call any substance that is foreign to the human body an antigen. The body is exposed to many antigens at any given moment, and the immune system has different methods for handling each situation. The immune system also preserves the body's internal environment by scavenging dead and damaged cells.

The functioning of the immune system is very complex. It is made up of different types of white blood cells (WBCs), the lymphatic system, and many organs (e.g., the thymus, spleen, and bone marrow). This system has many back-up systems, more than any other function of the body. This is because fighting infection is critical to the survival of the human organism.

The three separate levels of defense in the immune system are the:

- Protective Surface Phenomena
- General Host Defense
- Specific Immune Response

In addition to these levels of defense, the immune system has a clean-up function designed to deal with the residual products of destruction following an immune response. This final phase of immune system activity allows the body to re-establish readiness for the next assault on the immune system.

Content Outline:

I. The Protective Surface Phenomena

A. The body's first line of defense against invasion by antigens.

B. This level works primarily as a barrier to entry.

C. It involves the skin, respiratory and gastrointestinal (GI) systems.

II. The General Host Defense

A. This secondary line of defense is turned on whenever an antigen succeeds in penetrating the first line of defense.

1. the primary goal here is to contain the antigen in the smallest possible area.

2. this is done by setting up a wall around the site of penetration. through a process known as "inflammation".

B. The cells and organs involved in this level of defense include:

1. macrophage

2. bone marrow

III. The Specific Immune Response

A. The functions of this level of immune response are to:

1. react to a specific antigen.

2. produce specific antibodies to destroy specific antigens.

3. keep the immune response active until the antigen is destroyed.

4. turn off the process when the antigen is destroyed.

B. The cells and organs involved in this level of defense include:

1. T4 cells (also known as CD4 cell, inducer cells, or T helper cell).
2. T8 cells (also known as CD8, T suppressor cell, or killer cell)
3. B cells
4. antibodies
5. bone marrow
6. thymus
7. spleen

IV. The Immune System Also Contains A Clean-Up Function

A. The cells and organs involved in the clean-up process include:

1. lymph nodes
2. macrophages
3. spleen
4. tonsils, adenoids, and the appendix

Clients are now noting, and not rescheduling, their medical appointments. My clients now look at me as someone who they can share their medical issues with and not just someone who comes to their homes to do the laundry or clean the house.

Angela Barnes
Case Manager Assistant
ActionAIDS

AN OVERVIEW OF HIV

RATIONALE:

In order to understand how HIV affects the body's systems, we must first come to a clear understanding of what HIV is, how it enters the human body, and how the body attempts to cope with this foreign invader. Without this information, it is unlikely we will be able to fully understand the way a human body operates when it is compromised by HIV infection. Without this understanding, service care provider's attempts to improve the quality of life of a PWA is severely compromised.

GOAL:

Students will learn detailed information about HIV, including:

1. how HIV is transmitted into the human body,
2. the special characteristics of HIV and their affect on the body,
3. the human body's response to HIV infection, and
4. the different categories of HIV disease progression.

OBJECTIVES:

At the completion of this lesson, students will:

1. have learned the definitions of the lesson's key terms, so that they can correctly identify and/or define those terms presented on the chapter quiz.

2. correctly name the four body fluids through which HIV is primarily passed from an infected person to an uninfected person.

3. given the 3 levels of immune defense, write a 1-2 sentence summary of how this level of defense responds to the initial assault by HIV.

4. correctly name the 4 types of cells identified in class that have CD4 protein on their outer cell wall.

5. briefly explain how HIV changes the way a host cell thinks and works by making reference to RNA-DNA conversion, HIV DNA integration into the host cell's nucleolus, and the host cell producing new HIV particles.

6. briefly explain how HIV disease progression results in the compromise of the immune system by making reference to the affect on any 2 of the following: T4 cells, macrophages, mucous cells, lymph cells.

7. briefly identify the results of HIV mutations by accurately explaining how the immune system reacts to these mutated HIV particles.

8. correctly list the 3 levels of symptoms and the 3 levels of T-cell count used in HIV disease progression, as shown on Appendix F given out in class.

MATERIALS NEEDED:

General supplies needed include:

- chalk board, dry erase board, or newsprint pads
- markers
- masking tape
- pens and pencils
- paper for taking notes (if students do not have notebooks)

Lesson plan
Student guide
Lesson quiz
Appendix E: Infection Control Recommendations
Appendix F: HIV Disease Progression

KEY TERMS:

apoptosis	DNA	docking arm
gp-120	host cell	mutation
retrovirus	reverse transcriptase	RNA
viral core	virus	

PROCESS:

Introduction:

In order to understand the Human Immuno-deficiency Virus (HIV), we must first understand the unique characteristics of a virus. A virus is not a cell. It is made up of a string of genes (either DNA or RNA) surrounded by a protein coat. Viruses live and reproduce within living cells. Viruses are cell specific; that means a particular virus only attacks a particular cell. (e.g., cold viruses attack the cells of the respiratory track but not the liver. The chicken pox virus attacks nerve cells, but not muscle cells). Each virus contains a series of proteins on its outer shell that act like a "docking arm". This docking arm latches onto specific proteins on the outer wall of their preferred cells type. Once connected by the docking arm, a virus can enter a living cell.

HIV has all of the above characteristic plus it:

a) has a preference for cells with CD4 protein on their outer cell wall;

b) can live and reproduce within a host cell for years without producing illness;

c) has the ability to change the way a host cell thinks and does its job;

d) can program a host cell to self-destruct;

e) can change its appearances so that the immune system does not recognize it as HIV.

Lecture:

I. Transmission of HIV

A. Since the HIV pandemic began, we have learned a great deal about how HIV is transmitted. In the early days, there was speculation that HIV was easily transmitted through a variety of body fluids including sweat, saliva, and tears. Fear and paranoia led many to think toilet seats, door knobs and hugging or touching an infected individual put one at risk for HIV infection. Some believed just being in the presence of an infected individual was risky. This fear resulted in widespread avoidance of persons infected with HIV by neighbors, co-workers, friends, family, and even the health care community.

B. Although there is still a great deal to know about containing the disease once the body is infected, there is a great deal now known about the transmission of HIV. Specifically, we know that:

1. HIV is destroyed by exposure to air.

2. the protective surface phenomena level of immune system defense ***[NOTE: see immune system lesson]*** is very affective in preventing the transmission of HIV.

3. HIV is almost completely controlled by universal precautions.

4. HIV is primarily passed through one of the following infected body fluids entering the bloodstream of another person:

a) blood (including menstrual blood)

b) semen (including pre-ejaculatory fluid)

c) vaginal secretions

d) breast milk

II. The body's initial response to HIV exposure

A. The "protective surface phenomena" attempts to keep HIV out. This is very affective, except in the case of injected drug use where this level of defense is completely by-passed.

B. The "general host defense" is triggered by any virus that enters the body. An attempt is made to contain the virus with the "inflammatory process". Macrophages engulf and destroy most HIV particles.

C. The "specific immune response" is triggered when a macrophage sends a chemical blueprint of HIV to a T4 cell.

1. When HIV is a new antigen to the body, T4 cells send out a chemical message to the bone marrow to produce B cells capable of creating HIV specific antibodies.

2. These antibodies are released to seek out and destroy HIV. After this, T4 cells know HIV and can respond to it more quickly when it is again detected circulating freely in the body ***[NOTE: mainly in the bloodstream]***.

3. Within a week this process of antibody production and circulation is fully active. As with any other antigen, most, but not all, of the HIV in the body is destroyed.

4. Depending on the amount of virus in the initial exposure, the body will likely "turn off" the immune response in 10-20 days.

[NOTE: During the 10-20 days of immune response, the individual may experience "flu-like" symptoms. These symptoms are part of the normal inflammatory response to any serious pathogen.]

III. How the Special Characteristics of HIV affect the body's immune response.

A. Although the initial immune response destroys most HIV particles, some are successful at attaching to and entering cells of the body.

B. HIV has a preference (also known as an affinity) for cells with CD4 protein on their outer cell wall.

1. HIV's "docking arms" are called gp-120. They cover the outer shell of the virus. These docking arms are designed to attach to CD4 proteins.

2. CD4 protein can be found primarily on:

a) T4 cells everywhere in the body

b) macrophages in blood and brain

c) mucous cells in anus, genitalia, and respiratory system

d) lymph nodes all over the body

3. Ironically, when HIV initially enters the body, it is the above listed cells that are produced in large numbers during the specific immune response to destroy HIV. This results in giving the virus more possible targets to attack.

4. Most of the HIV particles are destroyed during the initial immune response, but some attach their docking arms to the CD4 protein of these cells. Once attached to a CD4 protein, the body can no longer recognize HIV as a free floating virus, and therefore cannot destroy it. HIV is safe from harm once it connects to a CD4 protein.

5. Once HIV attaches its docking arm to a host cell, it is able to enter the cell. Once inside the cell, HIV is "hidden" from the immune system because our immune system cannot "see" inside cells to check for antigens.

[The invasion of HIV into the body can be compared to soldiers facing hand to hand combat with alien troops. The aliens and soldiers rush toward each other. Most of the aliens are killed in the initial rush. But, the aliens have special powers. If they can grab hold of a soldier, they become invisible. As the soldiers look around at the end of the initial battle they only see the dead aliens (but not the invisible ones). The soldiers, feeling victorious, pack up and go home. They are totally unaware that they are carrying the invisible aliens straight to their base and their leaders.]

C. HIV can live and reproduce within the host cells for years without producing any symptoms of illness.

1. once the docking arm is in place, the viral shell dissolves and the viral core enters the host cell.

2. the HIV viral core contains:

a. the virus' genetic code (how the cell thinks and works) and

b. a unique substance called reverse transcriptase. This allows some of the viral RNA to convert into DNA.

[Once the invisible aliens are brought into the army base, they unpack their gear and wait to make their next move.]

A. HIV has the ability to change the way host cells think and do their job.

1. The DNA in every cell's nucleolus acts as the brains of the cell. It directs all the cell's activities, allowing it to perform its specific job.

2. HIV uses RNA as its "brains". ***[NOTE: viruses that use RNA instead of DNA as their brains are called retroviruses.]*** This RNA cannot interfere with a host cell's DNA unless it is changed into DNA first. Using the reverse transcriptase, the virus converts some of its RNA into DNA.

a) this DNA is then incorporated into the host cell's DNA.

b) this changes the rules of operation within the host cell.

(1) as a result, the host cell's functions change.

(2) the change in function depends on what part of the DNA code becomes distorted by HIV.

[The aliens in the army base cannot begin giving orders to the base personnel until they look like and sound like the base commanders. Changing their appearance and language (RNA) to mimic that of the base commanders (DNA) allows the aliens to completely take over the army base. The base troops now think they are taking orders from their commanders, but they are really being led by the disguised aliens]

3. In addition to affecting how the host cell functions, the new programming HIV introduces into the host cell turns it into an HIV producing factory.

a) viral RNA is produced inside the host cell's cytoplasm, and is gathered up with some reverse transcriptase to create a new virus particle.

b) this new virus particle buds out of the infected host cell to seek out another CD4 covered cell to attach itself to.

c) as long as the host cell's programming remains altered, and the host cell remains functional, this process will be repeated again and again.

[With the new orders given by the disguised aliens, the base troops now do things that help the aliens and threaten their own survival. They create new aliens.]

[NOTE: In the asymptomatic phase, viral replication is more active in the lymph nodes than in the blood. Replication in the blood significantly increases when the lymph node architecture is destroyed (this will be discussed in more detail in the lesson on the lymph system).]

4. the infected host cell functions improperly as long as it lives.

5. as more and more cells become infected, the effectiveness of their work declines.

a) T4 cells become less accurate when sending out messages to the other immune cells.

b) macrophages engulf fewer antigens, send inaccurate blueprints to T4 cells, and set up a less affective inflammatory process, allowing antigens to spread more easily in the body and brain.

c) mucous cells become less affective in their role in the protective surface phenomena, allowing more antigens to enter the body.

d) lymph nodes are less affective at filtering out toxins, debris, and damaged cells, preventing the body from attaining proper balance.

6. The speed of HIV disease progression is directly related to the number and type of cells that become infected.

[As invaded army bases produce more aliens, and as more and more bases get invaded, the function of the army itself begins to break down.]

B. HIV can program a host cell to self destruct.

1. an enzyme found in the nucleus of all cells that causes the cell to self-destruct. This happens normally in the body to cells that are old and not functioning well.

2. cells infected with HIV, in some persons, tend to destroy themselves early in the life of the cell, this is called apoptosis.

3. when T4 cells (the master minds of the immune system) become the target of premature apoptosis, the body becomes highly vulnerable to infection or opportunistic diseases.

4. there is currently much research on this issue. Although there are many conflicting theories on the topic, the important issue for our purposes is to know that there seems to be a direct correlation between cell depletion and disease progression.

[The aliens set off the auto-destruct sequences in many army bases. The more bases that blow up, the faster the alien's destroy the country.]

C. HIV can change its appearance so that the immune system cannot recognize it as HIV.

1. One of the most frustrating characteristics, from a treatment point of view, is that the HIV particles that come out of an infected cell are often slightly different than the original particle that infected the cell in the first place.

2. When the HIV specific antibodies stored in the body come into contact with this slightly altered HIV, they do not recognize it as the invader it is programmed to seek and destroy, so they leave it alone.

3. The signal then goes out to the rest of the immune system that there is a new antigen present in the body (the mutated HIV).

a) The specific immune response is turned on again and new antibodies are made.

b) This process takes 10-20 days, which is sufficient time for HIV to find another host cell to attach its docking arms to, enter, infect, replicate, and finally to bud out of the latest host cell looking different again from the virus particle that went into that host cell.

[The aliens can alter their appearance when they leave an army base. This allows them to walk right past soldiers on patrol looking for aliens. If they are detected, the army sees it as an invasion by an entirely new species of aliens. It mounts a whole new defense against this "new species". By the time that is in place, the aliens have already invaded and taken over a host of new army bases and have taken on yet another new disguise.]

II. It is critical to understand and remember:

A. HIV is capable of impacting every level of defense of the immune system.

B. HIV progresses one cell at a time, through infection or destruction of the cell. This can take as long as 10-15 years.

C. Disease progression is influenced by the "potential" (current state) of each individuals health.

III. HIV Disease Progression

A. The medical profession, in general, is accustomed to classifying disease progression with phases or "classes". Over the years, HIV disease progression has been divided into three phases or classes:

1. infected-asymptomatic (also called latent or dormant period)

2. symptomatic

3. AIDS (also called full-blown infection)

B. HIV classification, medically speaking, guides treatment plans, prognosis, and occasionally planning for death.

C. More recently, 3 levels of T cell count have been added to the classification process:

1. over 500

2. 200-499

3. under 200

D. When these 3 levels of T cell counts are added to the 3 possible degrees of symptoms experienced, there are now nine possible stages of HIV progression. ***[NOTE: See "HIV Disease Progression" handout.]*** This new more complex classification allows for improved treatment, and prevention. These new categories are beginning to show up in research and drug profiles when suggesting treatment plans.

E. Along with T cell count and symptoms, viral load has recently been added to the list of predictors of HIV disease progression. Viral load is the actual measurement of HIV RNA in the blood.

1. there are not yet specific diagnostic categories of viral load.

2. in general, a lower viral load may be indicative of a slower disease progression.

3. a lower viral load means there is less virus replication, therefore there are less changes for mutations to develop which may further compromise the immune system

IV. Constitutional Symptoms of Illness and HIV

A. Constitutional symptoms are symptoms that are present in many unrelated disorders or illnesses. These only provide minimal diagnostic assistance in caring for PWAs.

1. Constitutional symptoms of illness seen in people with healthy immune systems include:

a) fever

b) swollen lymph nodes

c) headache

d) fatigue

e) muscle aches and weakness

f) loss of appetite

g) nausea/vomiting

h) diarrhea/constipation

2. There are also a number of symptoms (in addition to all of the above) that we need to see as a RED FLAG for HIV+ individuals, regardless of their classification. These symptoms could be early warning signs of an infection and should not be ignored or dismissed; these include:

a) skin lesions, rashes, lumps or bruises

b) lesions or exude in the mouth

c) unexplained weight loss

d) shortness of breath

e) persistent cough, productive or non-productive

f) photophobia (sensitivity to light)

g) forgetfulness

h) dizziness

i) unusual bleeding

V. Normal Lymphocyte Blood Values

A. The immune system works best when all its parts exist in their proper amounts. The following chart gives the normal absolute counts and percentages of immune cells. By knowing these normal levels, service care providers can more accurately assess immune system activity and level of immune system compromise when examining lab reports and other medical documentation of immune system activity.

Immune Cell	Absolute Counts	Percentages
T4 cell	650-2200	35-70%
T8 cell	180-785	10-40%
T4/T8 ratio	over 1	
B cell	80-390	3-20%

B. Some Helpful Hints:

1. lymphocytes include: T cells, B cells.

2. when an absolute count is given, it refers to the number of a specific cell in a quantity of blood (a drop, a microdrop, it is usually standard).

3. T4 cells can fluctuate over 1000 cells in a twelve hour period.

4. the normal T4/T8 ratio is 2:1, or two T4 cells to each one T8 cell.

HANDOUTS

Appendix E: Infection Control Recommendations
Appendix F: HIV Disease Progression

EVALUATION

Student Quiz

SUPPLEMENTAL ACTIVITIES

Reading, ***No Time to Wait***: Chapter 2
Chapter 4, pages 54-63
Table 4-3

Handouts/Skills/ Materials:

Not Included:

A Poster of HIV

Included :

Review:
Use of gloves: how and when (Appendix C)
Skin care (Appendix D)
Mouth care (Appendix D)
Handwashing (Appendix D)
Food selection (Appendix D)
Perform and discuss: Infection control cleaning techniques (Appendix D)
Identify constitutional symptoms and discuss appropriate actions
Discuss safe sex behavior with clients (Appendix D)
Discuss stress management techniques with clients (Appendix D)
Discuss infection control practices with clients (Appendix D & E)

AN OVERVIEW OF HIV

Name: _____ Date: _____

PART I - True or False

Directions: Read each statement carefully. In the space provided, write the word "True" if the statement is true, or write the word "False" if the statement is false

_____ 1. A virus is a specific kind of cell.

_____ 2. HIV is primarily transmitted through blood, semen, vaginal fluids, and breast milk.

_____ 3. The protective surface phenomena is fairly ineffective in keeping HIV out of the body.

_____ 4. CD4 proteins coat the outer surface of HIV.

_____ 5. The 3 classes of HIV disease progression are Infected-Asymptomatic, Symptomatic, and AIDS.

PART II - Short Answer

Directions: Read each item carefully. In the space provided, write a brief answer that addresses all aspects of the question.

6. Briefly define the following key terms from this lesson:

a) gp-120: _____

b) apoptosis: _____

c) retrovirus: _____

7. Briefly describe the process by which HIV changes the way a host cell thinks and does its job:

8. One of the characteristics that makes HIV difficult for the body to destroy is that it can change its structure quickly and often. Explain how this happens and why this characteristic makes HIV hard to control:

AN OVERVIEW OF HIV

WHY STUDY HIV?:

In order to understand how HIV affects the body's systems, we must first come to a clear understanding of what HIV is, how it enters the human body, and how the body attempts to cope with this foreign invader. Without this information, it is unlikely we will be able to fully understand the way a human body operates when it is compromised by HIV infection. Without this understanding, service care provider's attempts to improve the quality of life of a PWA is severely compromised.

LESSON OBJECTIVES:

At the completion of this lesson, students will:

1. have learned the definitions of the lesson's key terms, so that they can correctly identify and/or define those terms presented on the chapter quiz.

2. correctly name the four body fluids through which HIV is primarily passed from an infected person to another person.

3. given the 3 levels of immune defense, write a 1-2 sentence summary of how this level of defense responds to the initial assault by HIV.

4. correctly name the 4 types of cells identified in class that have CD4 protein on their outer cell wall.

5. briefly explain how HIV changes the way a host cell thinks and works by making reference to RNA-DNA conversion, HIV DNA integration into the host cell's nucleolus, and the host cell producing new HIV particles.

6. briefly explain how HIV disease progression results in the compromise of the immune system by making reference to the affect on any 2 of the following: T4 cells, macrophages, mucous cells, lymph cells.

7. briefly identify the results of HIV mutations by accurately explaining how the immune system reacts to these mutated HIV particles.

8. correctly list the 3 levels of symptoms and the 3 levels of T-cell count used in HIV disease progression, as shown on Appendix F given out in class.

KEY TERMS:

apoptosis	DNA	docking arm
gp-120	host cell	mutation
retrovirus	reverse transcriptase	RNA
viral core	virus	

LESSON CONTENT (SUMMARY):

Introduction:

In order to understand the Human Immuno-deficiency Virus (HIV), we must first understand the unique characteristics of a virus. A virus is not a cell. It is made up of a string of genes (either DNA or RNA) surrounded by a protein coat. Viruses live and reproduce within living cells. Viruses are cell specific; that means a particular virus only attacks a particular cell. (e.g., cold viruses attack the cells of the respiratory track but not the liver. The chicken pox virus attacks nerve cells, but not muscle cells). Each virus contains a series of proteins on its outer shell that act like a "docking arm". This docking arm latches onto specific proteins on the outer wall of their preferred cells type. Once connected by the docking arm, a virus can enter a living cell.

HIV has all of the above characteristic plus many other special characteristics.

Content Outline:

I. Transmission of HIV

A. Since the HIV pandemic began, we have learned a great deal about how HIV is transmitted.

B. There is a great deal now known about the transmission of HIV.

II. The body's initial response to HIV exposure

A. The "protective surface phenomena" attempts to keep HIV out. This is very affective, except in the case of injected drug use where this level of defense is completely by-passed.

B. The "general host defense" is triggered by any virus that enters the body. An attempt is made to contain the virus with the "inflammatory process".

C. The "specific immune response" is triggered when a macrophage sends a chemical blueprint of HIV to a T4 cell.

Special characteristics of HIV :

D. HIV has a preference (also known as an affinity) for cells with CD4 protein on their outer cell wall.

E. HIV can live and reproduce within the host cells for years without producing symptoms of illness.

F. HIV has the ability to change the way host cells think and do their job.

G. HIV can program a host cell to self destruct.

H. HIV can change its appearance so that the immune system cannot recognize it as HIV.

III. It is critical to understand and remember:

A. HIV is capable of impacting every level of defense of the immune system.

B. HIV progresses one cell at a time, through infection or destruction of the cell. This can take as long as 10-15 years.

C. disease progression is influenced by the "potential" or current state of each individuals health.

IV. HIV Disease Progression

A. HIV disease progression has been divided into three phases or classes:

1. infected-asymptomatic (also called latent or dormant period)

2. symptomatic

3. AIDS (also called full-blown infection)

B. More recently, 3 levels of T cell count have been added to the classification process.

1. Over 500

2. 200-499

3. Under 200

C. When these 3 levels of T cell counts are added to the 3 possible degrees of symptoms experienced, there are now nine possible stages of HIV progression. This new more complex classification allows for improved treatment, and prevention. These new categories are beginning to show up in research and drug profiles when suggesting treatment plans.

D. Along with T cell count and symptoms, viral load has recently been added to the list of predictors of HIV disease progression. Viral load is the actual measurement of HIV RNA in the blood

V. Constitutional Symptoms of Illness and HIV

A. Constitutional symptoms are symptoms that are present in many unrelated disorders or illnesses. These only provide minimal diagnostic assistance in caring for PWAs.

B. There are also a number of symptoms (in addition to all of the above) that we need to see as a RED FLAG for HIV+ individuals, regardless of their classification. These symptoms could be early warning signs of an infection and should not be ignored or dismissed.

VI. Normal Lymphocyte Blood Values

A. The immune system works best when all its parts exist in their proper amounts. The following chart gives the normal absolute counts and percentages of immune cells.

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T4 cell	650-2200	35-70%
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T4/T8 ratio	over 1	
B cell	80-390	3-20%

A. Some helpful hints:

1. lymphocytes include: T cells, B cells.

2. when an absolute count is given, it refers to the number of a specific cell in a quantity of blood (a drop, a microdrop; it is usually standard)

3. T4 cells can fluctuate over 1000 cells in a twelve hour period.

4. the normal T4/T8 ratio is 2:1, or two T4 cells to each one T8 cell.

My clients feel good about the medical training. They are proud of me. They ask me to go to their doctors appointments more often then before. Clients don't rely on me as much for practical work. They confide in me more for emotional support.

Adele Butler
Case Manager Assistant
ActionAIDS

THE LYMPHATIC SYSTEM AND HIV

RATIONALE:

The body's health is dependent upon the proper functioning of the lymphatic system. HIV both directly and indirectly affects this system. With an understanding of the structure, function, and affects of HIV on the lymphatic system, service care providers can better understand and respond to medical and home care needs of HIV infected individuals that result from damage to this system.

GOALS:

1. Students will learn the structure and function of the lymphatic system.

2. Students will learn the direct and indirect affects HIV has on the lymphatic system.

OBJECTIVES:

At the completion of this lesson, students will:

1. have learned the definitions of the lesson's key terms, so that they can correctly identify and/or define those terms presented on the chapter quiz.

2. correctly describe the structure of the lymphatic system, including the capillary network, lymph vessels, veins, and lymph nodes.

3. correctly identify the 3 sites of large lymph node clusters as the neck, armpits and groin.

4. accurately list the 3 functions of the lymphatic system as presented in the lecture.

5. identify the difference between the vascular and lymphatic circulatory systems in order to make clear that the lymphatic system backs up the more important vascular system.

6. correctly identify lymphadenopathy as the direct affect of HIV on the lymphatic system.

7. identity how infected lymph nodes and vessels affect the performance of the lymphatic circulation by correctly listing and/or identifying the 3 items mentioned in the lecture pertaining to this issue.

8. accurately identify how dehydration indirectly affects the lymphatic system by making reference to the slow down of this system due to fluid being diverted to the vascular circulatory system.

9. correctly identify the major symptoms of opportunistic infections (OIs) associated with this system, as listed on Appendix G.

MATERIALS NEEDED:

General supplies needed include:

- chalk board, dry erase board, or newsprint pads
- markers
- masking tape
- pens and pencils
- paper for taking notes (if students do not have notebooks)

Lesson plan
Student guide
Lesson quiz
Appendix G: Chart of Common HIV Related Disorders
Appendix H: Signs and Symptoms of AIDS Related Disorders

KEY TERMS:

capillary network	lymph gland	lymph node
lymphoid tissue	lymph vessels	opportunistic infection
plasma	vascular circulation	

PROCESS:

Introduction:

The lymphatic system has three primary functions:

- to provide a secondary circulation system for the body's fluids (as opposed to the main circulation of blood and blood products through the body).

- to provide sites for immune cell storage.

- to clean body fluid of waste, toxins, and antigens as it circulates through the lymph nodes.

The immune system cells (T cells and B cells) are stored in and pass thorough the lymph vessels and lymph nodes. Lymph vessels are found in the brain and organs active in the protective surface phenomena (e.g.,, GI system, respiratory system, vagina, bladder and urethra). The placement of lymph vessels near these organs is important. This proximity helps to ensure that antigens which penetrate the surface protection phenomena will be dealt with quickly.

In HIV infected individuals, the cells of the lymph vessels and lymph nodes are in constant exposure to HIV and become infected early in the disease process. Research has recently discovered that in the asymptomatic phase of HIV disease progression, the highest level of viral replication takes place in the lymph nodes. Researchers speculate that viral loads in the blood become higher as the lymphatic system becomes more infected and less functional. This implies that the lymphatic system is much more involved in the control of HIV than was ever thought before. Early treatment of HIV asymptomatic individuals could become standard as a result of understanding more about the function of the lymphatic system and the part it plays in HIV disease progression.

Lecture:

I Structure of the lymphatic system

A. The flow of the fluid in the lymphatic system is only and always one way, towards the heart and blood stream.

1. this allows lymphatic system fluid, called plasma, to get back into the blood stream.

   [NOTE: see the lesson on the circulatory system for more discussion of plasma]

2. debris and toxins collected by the immune cells can get broken down further before re-entering the blood stream (see function of lymphatic system below).

   [NOTE: The instructor may want to review the clean-up function of the immune system here]

[The structure of the lymphatic circulatory system can be compared to a system of roads. All these roads are only one way. They all lead from the smallest streets towards the center of town.]

B At the smallest point of the lymphatic system, called the capillary network, the system is closed. This is unlike vascular (blood) circulation which is a continuous loop.

C Lymphocytes (T cells and B cells) and plasma enter the capillary network from the extracellular space through the mesh-like wall of the capillaries.

[Traffic enters the system on the smallest roads at the beginning of the system.]

D. The capillaries merge into larger and larger lymph vessels.

E. The lymph vessels then drains into large veins in the chest and neck.

[The small streets continually merge into larger and larger roads.]

F. Lymphatic fluid periodically passes through a lymph filtering station called a lymph node. These are also known as lymph glands.

1. lymph nodes can be as small as the head of a pin or as large as a bean.

2. lymph nodes are clustered together throughout the body.

a. large lymph nodes are clustered primarily in:

(1) the neck: these drain the head

(2) the armpits: these drain the upper extremities and chest

(3) the groin: these drain the lower extremities and abdominal organs

b. smaller lymph nodes are clustered in:

(1) the brain

(2) the intestines

(3) the mouth, nose, and throat

(4) the vagina

(5) the bladder and urethra

[There are inspection stations clustered along the roads. All vehicles must pass through the inspection stations. At these stations, vehicles are repaired and/or destroyed (see function section below for further details).]

II. Functions of the lymphatic system

A. Provides the body with a secondary circulatory system to handle the many functions of fluid in the body. The lymphatic circulation acts as a back-up to the vascular circulation.

1. there are two circulatory systems in the body:

a. vascular circulatory system, also known as the "blood stream" contains RBCs, WBCs, and plasma.

b. lymphatic circulatory system, contains lymphocytes (T cells and B cells) and plasma.

[The lymph system can be compared to an alternative traffic network. In the best situations, there is always more traffic than the main road wants to handle, so some traffic is diverted onto this alternative network. The main traffic network must maintain a certain flow of traffic (fluid balance). If the traffic flow gets high or low, the alternative traffic network attempts to take in or send out traffic as needed.]

2. a well hydrated body is 60% fluid. Fluids can be found in a variety of places:

a. in the GI system (mostly the fluids we drink).

b. in the space surrounding the brain and spinal core.

c. in the two circulatory systems, as mentioned above.

d. inside cells (cytoplasm and nucleoplasm).

e. in the space between the cells and the capillary beds (the extracellular space).

B. Assists the vascular circulatory system with the clean-up of plasma resulting from normal bodily functioning, such as:

1. removal of cells following there damage or death

2. destruction of abnormal cells (e.g., pre-cancerous cells)

3. removal of the toxic by-products of metabolism

C. Assists the immune system in controlling infection throughout the body

[This function of the lymphatic system can be compared to the working of the highway patrol. The immune cells are the members of the patrol.]

1. lymph vessels and lymph nodes, although found all over the body, are especially prevalent in the locations where microorganisms are most likely to penetrate the protective surface phenomena.

[NOTE: Remember that T cells and B cells are stored in these nodes]

[When things are quiet, the highway patrol rest at the inspection station waiting for a traffic emergency.]

2. lymph nodes release T cells and B cells as needed to control infection.

[When an emergency is identified (an antigen is detected), the patrol goes out. The patrol is looking for broken down cars (damaged and old cells) and foreign cars (antigens).]

3. during and following an immune response, there are many by-products resulting from antigen breakdown and cell destruction that need to be removed from the site of infection. Lymph nodes filter out these by-products in the following manner:

a. macrophages bring their waste products to the lymphatic capillary network, enter the vessel and deposit the waste.

b. plasma provides movement of the waste through the system.

c. as the waste moves through the lymph nodes, it is filtered and the fluid is returned to the bloodstream.

d. once in the bloodstream, remaining waste products are filtered further by the liver and spleen (where all blood is filtered).

e. waste filtered out is eliminated from the body via urine or stool.

[When a foreign car (antigen) is identified, the patrol calls out a tow truck (macrophage) to transport the offender to the nearest inspection station (lymph node) and will stay with the offender until the problem is rectified. If the tow truck brings the offender to one of the smaller inspection stations, the offender may not be fully processed. The tow truck will bring the offender to a larger station until the offender is totally processed. If the problem cannot be completely resolved, the foreign car is destroyed.]

III Direct Affects of HIV on the lymphatic system

A. Enlargement of the lymph nodes, called lymphadenopathy, due to over working.

1. this is often the earliest sign of HIV infection.

2. even before the nodes become infected, they are working hard to clear out the waste products produced by the initial and ongoing immune response to HIV.

3. over time, infected T cells and B cells are stored in the nodes.

4. it is believed that during this storage, the nodes themselves and the cells of the lymph vessels become infected.

B. The infection of the nodes and vessels affects the performance of the lymph circulation

1. this limits the lymph system's ability to respond to fluid balance issues in the body.

2. this also limits the lymph system's ability to filter out abnormal cells and complete waste breakdown.

a. cancer cells are not always destroyed.

b. toxins can build up in the system.

c. toxins can be passed into the vascular circulatory system without being neutralized.

d. the liver, spleen, and kidneys can become over burdened.

3. the responsiveness of the lymph nodes to T cell requests for B cells carrying specific antibodies is limited.

a. the wrong B cells or the wrong amount of B cells can be sent to respond to an antigen. This ultimately increases susceptibility to infection.

b. infectious agents that would not be a problem for the body, if not immune compromised, begin to cause illness.

[NOTE: it is in these ways that antigens take the opportunity of the weakened immune system and develop into an infection, hence the term "opportunistic infection" was born.]

IV. Indirect Affects of HIV on the Lymphatic System

A. Dehydration can result from the many GI problems associated with HIV. (This will be discussed more fully in later lessons.)

1. lymph circulation is dependent on adequate amounts of plasma being available to provide "flow" to the system.

2. the body works on a priority system when resources are limited.

a. the vascular circulatory system is responsible for maintaining blood pressure, which is critical to life.

b. the circulatory system will get more fluid than the lymphatic system when fluid is limited.

3. with inadequate fluid for circulation, the contents of the lymph system become sluggish and the system gets clogged.

a. immune cells get trapped and are not available to assist in the immune response.

b. as infected immune cells get trapped in the lymph nodes, there is a greater chance for the nodes themselves to become infected.

4. over time, an abnormally high level of toxins, damaged cells, cell debris, excess immune cells, etc. can collect in the vascular circulatory system.

a. the vascular system must find alternative methods for cleaning toxins and debris from the circulation.

b. other organs with some capacity to clean toxins and debris are utilized at this time including:

(1) the liver

(2) the spleen

(3) the kidneys

(4) the large intestines

c. these other organs can handle the overload in the short term, but over time they become burdened and their overall effectiveness is compromised.

[NOTE: If dehydration is temporary or sporadic, the lymph system can adapt and return to normal functioning.]

[NOTE: The impact of dehydration on HIV infected individuals is critical. It cannot be over-emphasized, as can be seen by the frequent references to it in this curriculum.]

V. Common Opportunistic Infections (See Chart of HIV Disorders of the Lymphatic System for details)

A. Non-Hodgkin's Lymphomas (NHLs)

B. Lymphomas

Chart of HIV Disorders of the Lymphatic System

Common HIV disorders	Cause	Symptoms/ Diagnosis	Comments/ Treatment
Non-Hodgkin's Lymphomas (NHLs)	Over growth of lymph node tissue. Lymphoma is **60 times more common** in AIDS patients than in immune competent individuals	Solid tumors that involve lymphatic tissue, usually found under arms, in neck and in groin. Also found in deeper lymph node involving bone marrow, the liver, and spleen. Usually asymptomatic, occasionally is accompanied with low grade fever, night sweats, wt loss, fatigue, loss of appetite. Dx: biopsy of enlarged node	Most lymphoma's are very treatable and successfully put into remission. The site and extent of growth strongly influences treatment plans. Tx: surgical removal, radiation, chemotherapy
Lymphomas (Primary brain/spinal cord lymphoma, systemic non-Hodgkin's lymphoma, Hodgkin's disease) **# 17 OI**	Lymphoma is **60 times more common** in AIDS patients than in immune competent individuals.	CNS: paralysis of one side of the body, loss of ability to speak or understand language, confusion, memory loss, seizures, apathy, lethargy; in some cases a headache is the only symptom. Presumptive Dx: MRI or CAT scan, spinal tap Definitive Dx: brain biopsy (rarely done due to complication)	On MRI and CAT scans, the lesions of primary lymphoma in the brain can be confused with those of toxoplasmosis of the brain. Both single and multiple lesions are seen. Primary lymphoma in the brain is usually a late complication of AIDS and difficult to treat. The site and extent of growth strongly influences treatment plans. Tx: surgical removal, radiation, chemotherapy

HANDOUTS

Appendix G: Chart of Common HIV Related Disorders
Appendix H: Signs and Symptoms of AIDS Related Disorders

EVALUATION

Student quiz

SUPPLEMENTAL ACTIVITIES

Reading, No Time to Wait: Tables 4-1, 4-3, 4-4

Handouts/Skills/ Materials:

Not Included:

- Palpate for enlarged nodes
- Home care of IV lines
- Diagram of Lymphatic System
- Chart of HIV Disorders of the Lymphatic System
- List commonly used chemotherapy for lymphomas
- Identify constitutional symptoms and discuss appropriate actions

Review:

- Use of gloves: how and when (Appendix C)
- Perform and discuss: Infection control cleaning techniques (Appendix D)
- Identify constitutional symptoms and discuss appropriate actions
- Discuss stress management techniques with clients (Appendix D)
- Discuss infection control practices with clients (Appendix D & E)

THE LYMPHATIC SYSTEM AND HIV

Name: _____ Date: _____

PART I - True or False

Directions: Read each statement carefully. In the space provided, write the word "True" if the statement is true, or write the word "False" if the statement is false

_____ 1. The flow of fluid in the lymphatic system is always one way, towards the heart.

_____ 2. The lymph system provides the body with a secondary circulation system to help handle the many functions of fluid in the body.

_____ 3. Lymphatic circulation consists of red blood cells (RBCs), white blood cells (WBCs), and plasma.

_____ 4. Once lymph nodes become infected with HIV, they are much better able to filter HIV out of the lymphatic fluid.

_____ 5. Two symptoms of lymphomas are paralysis on one side of the body and loss of the ability to speak.

PART II - Short Answer

Directions: Read each item carefully. In the space provided, write a brief answer that addresses all aspects of the question.

6. Briefly define the following key terms from this lesson:

a) plasma: _____

b) lymph node: _____

c) lymphadenopathy: _____

7. In class we discussed how the body utilizes a priority system when resources are limited. Briefly explain how this priority affects the lymphatic system when an HIV+ individual becomes dehydrated:

THE LYMPHATIC SYSTEM AND HIV

WHY STUDY THE LYMPHATIC SYSTEM?:

The body's health is dependent upon the proper functioning of the lymphatic system. HIV both directly and indirectly affects this system. With an understanding of the structure, function, and affects of HIV on the lymphatic system, service care providers can better understand and respond to medical and home care needs of HIV infected individuals that result from damage to this system.

LESSON OBJECTIVES:

At the completion of this lesson, students will:

1. have learned the definitions of the lesson's key terms, so that they can correctly identify and/or define those terms presented on the chapter quiz.

2. correctly describe the structure of the lymphatic system, including the capillary network, lymph vessels, veins, and lymph nodes.

3. correctly identify the 3 sites of large lymph node clusters as the neck, armpits and groin.

4. accurately list the 3 functions of the lymphatic system as presented in the lecture.

5. identify the difference between the vascular and lymphatic circulatory systems in order to make clear that the lymphatic system backs up the more important vascular system.

6. correctly identify lymphadenopathy as the direct affect of HIV on the lymphatic system.

7. identity how infected lymph nodes and vessels affect the performance of the lymphatic circulation by correctly listing and/or identifying the 3 items mentioned in the lecture pertaining to this issue.

8. accurately identify how dehydration indirectly affects the lymphatic system by making reference to the slow down of this system due to fluid being diverted to the vascular circulatory system.

9. correctly identify the major symptoms of OIs associated with this system, as listed on Appendix G.

KEY TERMS:

capillary network	lymph gland	lymph node
lymphoid tissue	lymph vessels	opportunistic infection
plasma	vascular circulation	

LESSON CONTENT (SUMMARY):

Introduction:

The lymphatic system has three primary functions:

- to provide a secondary circulation system for the body's fluids (as opposed to the main circulation of blood and blood products through the body)
- to provide sites for immune cell storage
- to clean body fluid of waste, toxins, and antigens as it circulates through the lymph nodes

The immune system cells (T cells and B cells) are stored in and pass thorough the lymph vessels and lymph nodes. Lymph vessels are found in the brain and organs active in the protective surface phenomena (e.g.,, GI system, respiratory system, vagina, bladder and urethra). The placement of lymph vessels near these organs is important. This proximity helps to ensure that antigens which penetrate the surface protection phenomena will be dealt with quickly.

In HIV infected individuals, the cells of the lymph vessels and lymph nodes are in constant exposure to HIV and become infected early in the disease process. Research has recently discovered that in the asymptomatic phase of HIV disease progression, the highest level of viral replication takes place in the lymph nodes. Researchers speculate that viral loads in the blood become higher as the lymphatic system becomes more infected and less functional. This implies that the lymphatic system is much more involved in the control of HIV than was ever thought before. Early treatment of HIV asymptomatic individuals could become standard as a result of understanding more about the function of the lymphatic system and the part it plays in HIV disease progression.

I. Structure of the lymphatic system

A. The flow of the fluid in the lymphatic system is <u>only and always</u> one way, <u>towards</u> the heart and blood stream.

B. At the smallest point of the lymphatic system, called the capillary network, the system is closed.

C. Lymphocytes (T cells and B cells) and plasma enter the capillary network from the extracellular space through the mesh-like wall of the capillaries.

D. The capillaries merge into larger and larger lymph vessels.

E. The lymph vessels then drains into large veins in the chest and neck.

F. Lymphatic fluid periodically passes through a lymph filtering station called a lymph node. These are also known as lymph glands.

II. Function of the Lymphatic System

A. Provides the body with a secondary circulatory system to handle the many functions of fluid in the body. The lymphatic circulation acts as a back-up to the vascular circulation.

B. Assists the vascular circulatory system with the clean-up of plasma resulting from normal bodily functioning

C. Assists the immune system in controlling infection throughout the body

III Direct Affects of HIV on the Lymphatic System

A. Causes enlargement of the lymph nodes, called lymphadenopathy, due to over working

B. The infection of the nodes and vessels affects the performance of the lymph circulation

III. Indirect Affects of HIV on the Lymphatic System

A. Dehydration can result from the many GI problems associated with HIV.

IV. Common Opportunistic Infections

A. Non-Hodgkin's Lymphomas (NHLs)

B. Lymphomas

I feel that the medical training helped me have a better understanding about HIV and AIDS. I feel that it enhanced the work I do. My clients ask more questions about their health.

Adele Butler
Case Manager Assistant
ActionAIDS

THE CIRCULATORY SYSTEM AND HIV

RATIONALE:

The proper functioning of the circulatory system is necessary for sustaining life. Although HIV has little direct affect on this system, it produces several indirect affects that can seriously compromise the health of HIV infected individuals. An understanding of the structure and function of the circulatory system and the affects of HIV on this system will help service care providers more accurately recognize health and life-threatening conditions pertaining to circulation.

GOALS:

1. Students will learn the structure and function of the circulatory system

2. Students will learn the affects HIV has on the circulatory system.

OBJECTIVES:

At the completion of this lesson, students will:

1. know the definitions of the lesson's key terms, so that they can correctly identify and/or define those terms presented on the chapter quiz.

2. accurately differentiate the terms atrium and ventricle on the chapter quiz.

3. write 1 sentence that accurately summarizes the work of the pulmonary circulation and write 1 sentence that accurately summarizes the work of the systemic circulatory system.

4. correctly identify the functions of arteries and veins.

5. correctly identify the capillary network as the site of all exchange of products in the circulatory system.

6. briefly explain the indirect affects HIV has on the circulatory system by accurately listing the impact on the respiratory and GI system, and the affects of dehydration on the circulatory system.

7. given the chart of vital signs in class, memorize the correct ranges of body temperature, pulse rate, respiratory rate, and blood pressure for the following age groups; adults, adolescents, 3-12 year old, and infants -3 years old.

MATERIALS NEEDED:

General supplies needed include:

- chalk board, dry erase board, or newsprint pads
- markers
- masking tape
- pens and pencils
- paper for taking notes (if students do not have notebooks)

Lesson plan
Student guide
Lesson quiz

KEY TERMS:

arteriole	artery	atrium
bloodstream	capillary network	heart
pulmonary circulation	systemic circulation	vasodilatation
vein	venioles	ventricle
vital signs		

PROCESS:

Introduction:

When studying the cell we noted that the critical "raw materials" needed by all cells are: O2, water, and dietary nutrients. Remember that cells need these in different quantities based on their work. It is important to recall this information when describing the functions of the circulatory system. These primary functions are:

- to provide a circuit for O2, H2O, and dietary nutrients to travel to every cell in the body

- to provide a mechanism for these substances to get out of circulation and become available for use by the cell

- to provide a mechanism for waste products to be removed from the cells and brought to the clean-up organs where they can be removed from the body

- to provide transportation of chemical messages sent from cell to cell (e.g., the T4 cells sending a message to the spleen to release immune cells into the blood stream)

The circulatory system, also called the bloodstream, merely acts as a transportation system for the body's cells. Although the actual function of the circulatory system is critical to life, its structure is relatively uncomplicated. Circulation involves a pump (the heart), two circuits that flow from the pump (the pulmonary and systemic circulation) through a toll booth (the capillary network) and back to the pump.

[NOTE: The key point of this lesson is that all transfer of information and goods, and all exchange of chemical messages, happens only at the capillary network or "toll booth".]

The work of getting substances (O2, H2O, nutrients, waste products, etc...) in and out of the bloodstream is actually done by other organs at the cellular level. The circulatory system is fairly passive, concentrating simply on pumping and moving blood along.

Lecture:

I. Structure and Function of the Circulatory System

A. The heart is the muscular pump of the circulatory system. This is its only function.

1. the heart is made up of four chamber.

2. two chambers receive blood from the lungs or the body (the atrium).

3. two chambers pump blood to the lungs or body (the ventricles). The muscles of the ventricles are thicker because they must pump with enough force to move blood through out the body.

B. The pulmonary circulation

1. in this circuit, blood flows to the lungs and back to the heart.

2. blood travels from the right side of the heart to the lung at about 25 pounds of pressure.

3. oxygen (O2) and carbon dioxide (CO2) are exchanged in the capillary network of the lung (see respiratory system lesson #6 for more details).

4. the blood returns to the left side of the heart.

C. The systemic circulation

1. in this circuit, blood flows to the body's cells and back.

[NOTE: It takes about 60,000 miles of blood vessels to accomplish this task.]

2. blood travels from the left side of the heart and carries oxygenated blood to every cell in the body. This process involves several steps:

a) blood moves out of the heart into blood vessels that move away from the heart, called arteries.

(1) this is called "arterial blood"

(2) the blood moves at about 120 pounds of pressure

[NOTE: This number represents the top number of blood pressure (B/P)]

b) blood then moves into smaller and smaller arteries. The smallest arteries in the body are called arterioles

c) arterioles open into a very thin walled capillary network

[This looks much like a road approaching a toll booth. One lane (the arteriole) opens up into many lanes (the tool booth)]

d) This is where all of the transfer of materials happens

(1) O2, H2O, nutrients, and chemical messages move out through the capillary walls into the extracellular fluid

[NOTE: extracellular fluid is not considered part of the circulatory system]

(2) waste products such as CO2 and toxins, and chemical signals from the cells, waiting in the extracellular fluid, move through the capillary walls into the bloodstream

[This looks like the other end of the toll booth. The many lanes of the toll booth (the capillary network) merge into one road (the smallest veins)]

3. blood then travels from the capillary network back to the right side of the heart. This process also includes several steps:

a. blood moves out of the capillary network and into small blood vessels that move blood towards the heart, called venules (this is called "venous blood".)

b. blood then moves into larger and larger veins. Veins are blood vessels that move blood towards the heart.

c. finally the blood returns to the right side of the heart. It flows into the top chamber of the heart (an atrium).

d. blood is then pumped down to the lower chamber of the heart (a ventricle).

e. the blood is pumped back out of the right side of the heart, and the pulmonary circuit begins again.

II. Direct Affects of HIV on System

A. HIV has little direct affect on the circulatory system

B. These cells are rarely infected.

III. Indirect Affects of HIV on this System

A. The indirect affects of HIV on this system become much more significant as the disease progresses.

1. affects are usually a result of dehydration at a cellular level.

2. affects often appear as changes in the vital signs controlled by the circulatory system (e.g., B/P and heart rate).

B. Respiratory affects:

1. when the lungs are filled with infection (as with PCP), less O2 and CO2 cross between the lungs and the bloodstream at the capillary network.

2. because O2 is critical to the survival of the body's cells, particularly brain cells, a chemical message is sent to the heart to pump faster/harder and to the lungs to breath faster.

[NOTE: This causes an increase in heart rate, the pulse becomes more forceful, and the respiratory rate increases.]

3. these activities are intended to increase O2 and decrease CO2 in the blood.

4. if this correction is not achieved (because no matter how hard the heart pumps the gases will not pass through the sick lungs), the cells must slow their work and conserve the O2 available.

[NOTE: Low oxygen and high carbon dioxide levels is one of the reasons for fatigue, headaches, muscle weakness, and shortness of breath in a PWA]

C. Dehydration affects:

1. as with the lymphatic circulation, when fluid in the bloodstream is low blood becomes thicker and more difficult to move.

2. low fluid levels can result from low fluid intake, diarrhea, sweats, and fever .

3. the heart must then work harder.

a. when the blood gets thicker, the exchanges at the capillary network become sluggish and the blood vessels open a little wider to allow more flow, this process is called vasodilatation.

[NOTE: vasodilatation causes a change in vital signs: B/P lowers and pulse becomes weaker]

b. when this condition persists for long periods of time, the capillary network can get totally clogged.

c. if circulation is not restored (through hydration), the cells nourished by that blocked capillary bed will die.

[NOTE: The body reverts to the "priority process" here and will begin to shut down to the less critical parts of the body such as skin, sex organs, and muscles. Every time premature cell death occurs in the body, the potential for maintaining health is decreased. HIV truly limits health cell by cell.]

D. GI affects:

1. all water and nutrients enter the blood stream as a result of the work of the GI system.

2. the immune system sets up an inflammatory process at the site of an intestinal infection.

3. this infection and/or inflammatory process often interferes with water and nutrients crossing from the intestines into the blood stream to be used by the cells.

[NOTE: This process will be discussed in greater detail in the digestive system lesson #9]

4. when water and nutrients are not available to the cells, chemical messages are sent out by the cells (carried through the bloodstream) to send more blood to the intestine.

5. this increase in blood supply is intended to increase the intake of water and nutrients.

[NOTE: Review the inflammatory process here:

• increased blood supply to the involved area is a classic response.

With GI infections, this is also true.

• when water and nutrients are limited and the body experiences further vasodilatation as a result of requests from cells demanding more water and nutrients, several negative affects can occur:

1) Blood is further limited to the rest of the body.

2) The intestines become engorged with blood which causes more swelling and further interferes with absorption of water and nutrients.

3) B/P is lowered as a result of dehydration.]

IV. Common Opportunistic Infections

A. None

V. Normal Vital Signs Per Age Group

A. Since vital signs are a measure, in part, of the status of the circulatory system, a chart of normal values is included below. Note that these are broad ranges.

Age Group	Temperature	Pulse Rate	Respiratory Rate	Blood Pressure
Adults	96.5 - 99.5	60 - 100	12 - 20	95/60 - 140/90
Adolescents	97.6 - 98.8	55 - 100	15 - 20	104/60 - 142/92
3-12 years	98 - 99	70 - 120	16 - 25	85/50 - 132/86
0-3 years	98.5 - 99.5	70 - 175	20 - 50	*****

HANDOUTS

None

EVALUATION

Student quiz

SUPPLEMENTAL ACTIVITIES

Reading, No Time to Wait: Chapters 5 & 6

Handouts/Skills/ Materials:

Not Included:

Instruction sheet on taking vital signs
B/P cuffs (enough for class to work in two's)
Stethoscopes (enough for class to work in two's)
Identify constitutional symptoms and discuss appropriate actions
Identify constitutional symptoms and discuss appropriate actions
Palpate for enlarged nodes
Home care of IV lines

Review:

Use of gloves: how and when (Appendix C)
Perform and discuss: Infection control cleaning techniques (Appendix D)
Discuss stress management techniques with clients (Appendix D)
Discuss infection control practices with clients (Appendix D & E)

THE CIRCULATORY SYSTEM AND HIV

Name: _____ Date: _____

PART I - True or False

Directions: Read each statement carefully. In the space provided, write the word "True" if the statement is true, or write the word "False" if the statement is false

_____ 1. The chambers of the heart that receive blood from the lungs or body are called the atria.

_____ 2. The pulmonary circulation consists of blood flowing to all of the body's cells and back again.

_____ 3. HIV has little direct affect on the circulatory system.

_____ 4. An indirect affect of HIV on the circulatory system occurs when the heart is made to pump harder in response to decreased oxygen supply to infected lungs.

PART II - Short Answer

Directions: Read each item carefully. In the space provided, write a brief answer that addresses all aspects of the question.

5. Briefly define the following key terms from this lesson:

a) vital signs _____

b) vasodilatation _____

c) capillary network _____

6. Briefly explain the difference between arteries and veins:

7. Below is the chart we studied in class detailing normal vital signs by age groups. Fill in the blank spaces as indicated.

Age Group	Temperature	Pulse Rate	Respiratory Rate	Blood Pressure
Adults		60 - 100	12 - 20	
Adolescents	97.6 - 98.8			104/60 - 142/92
3-12 years		70 - 120		85/50 - 132/86
0-3 years	98.5 - 99.5	70 - 175		******

THE CIRCULATORY SYSTEM AND HIV

WHY STUDY THE CIRCULATORY SYSTEM?

The proper functioning of the circulatory system is necessary for sustaining life. Although HIV has little direct affect on this system, it produces several indirect affects that can seriously compromise the health of HIV infected individuals. An understanding of the structure and function of the circulatory system and the affects of HIV on this system will help service care providers more accurately recognize health and life-threatening conditions pertaining to circulation.

LESSON OBJECTIVES:

At the completion of this lesson, students will:

1. have learned the definitions of the lesson's key terms, so that they can correctly identify and/or define those terms presented on the chapter quiz.

2. accurately differentiate the terms atrium and ventricle on the chapter quiz.

3. write 1 sentence that accurately summarizes the work of the pulmonary circulation and write 1 sentence that accurately summarizes the work of the systemic circulatory system.

4. correctly identify the functions of arteries and veins.

5. correctly identify the capillary network as the site of all exchange of products in the circulatory system.

6. briefly explain the indirect affects HIV has on the circulatory system by accurately listing the impact on the respiratory and GI system, and the affects of dehydration on the circulatory system.

7. given the chart of vital signs in class, memorize the correct ranges of body temperature, pulse rate, respiratory rate, and blood pressure for the following age groups: adults, adolescents, 3-12 year old, and infants -3 years old.

KEY TERMS:

arteriole	artery	atrium
bloodstream	capillary network	heart
pulmonary circulation	systemic circulation	vasodilatation
vein	venioles	ventricle
vital signs		

LESSON CONTENT (SUMMARY:

Introduction:
When studying the cell we noted that the critical "raw materials" needed by all cells are: O2, water, and dietary nutrients. Remember that cells need these in different quantities based on their work. It is important to recall this information when describing the functions of the circulatory system. These primary functions are:

- to provide a circuit for O2, H2O, and dietary nutrients to travel to every cell in the body

- to provide a mechanism for these substances to get out of circulation and become available for use by the cell

- to provide a mechanism for waste products to be removed from the cells and brought to the clean-up organs where they can be removed from the body

- to provide transportation of chemical messages sent from cell to cell (e.g... the T4 cells sending a message to the spleen to release immune cells into the blood stream)

The circulatory system, also called the bloodstream, merely acts as a transportation system for the body's cells. Although the actual function of the circulatory system is critical to life, its structure is relatively uncomplicated. Circulation involves a pump (the heart), two circuits that flow from the pump (the pulmonary and systemic circulation) through a toll booth (the capillary network) and back to the pump.

The work of getting substances (O2, H2O, nutrients, waste products, etc.) in and out of the bloodstream is actually done by other organs at the cellular level. The circulatory system is fairly passive, concentrating simply on pumping and moving blood along.

Content Outline:

I. Structure and Function of the Circulatory System

A. The heart is the muscular pump of the circulatory system. This is its only function.

B. The pulmonary circulation: blood flows to the lungs and back to the heart.

C. The systemic circulation: blood flows to the body's cells and back.

II. Direct Affects of HIV on System

A. HIV has little direct affect on the circulatory system.

B. These cells are rarely infected.

III. Indirect Affects of HIV on this System

A. The indirect affects of HIV on this system become much more significant as the disease progresses, usually a result of dehydration at a cellular level.

B. Respiratory affects: the heart pumps faster/harder and the lungs breath faster

C. Dehydration affects: the heart must work harder when the blood gets thicker.

D. GI affects: when water and nutrients are not available to the cells, chemical messages are sent out by the cells to send more blood to the intestines

IV. Common Opportunistic Infections

A. None

V. Normal Vital Signs Per Age Group

A. Since vital signs are a measure, in part, of the status of the circulatory system, a chart of normal values is included below. Note that these are broad ranges.

Age Group	Temperature	Pulse Rate	Respiratory Rate	Blood Pressure
Adults	96.5 - 99.5	60 - 100	12 - 20	95/60 - 140/90
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3-12 years	98 - 99	70 - 120	16 - 25	85/50 - 132/86
0-3 years	98.5 - 99.5	70 - 175	20 - 50	******

After clinic on Monday, I go to a wrap up session. At wrap up, there are two doctors, a nurse practitioner, nurse, two social workers, health educator, nutritionist and myself. There we share information about what's going on with the client. At first I did not feel comfortable at wrap up. Now after going through the training, I feel like I'm part of the team. I talk about the types of medications the client takes, if he or she is taking it properly, and what's going on in the client's house.

Irene Lindsey
Case Manager Assistant
ActionAIDS

THE RESPIRATORY SYSTEM AND HIV

RATIONALE:

The body's health is dependent upon the proper functioning of the respiratory system. HIV both directly and indirectly affects this system. With an understanding of the structure, function, and affects of HIV on the respiratory system, service care providers will be better able to understand and respond to health and life threatening conditions pertaining to respiration.

GOALS:

1. Students will learn the structure and function of the respiratory system.

2. Students will learn the direct and indirect affects HIV has on the respiratory system.

OBJECTIVES:

At the completion of this lesson, students will:

1. know the definitions of the lesson's key terms, so that they can correctly identify and/or define those terms presented on the chapter quiz.

2. list the two functions of the respiratory system as noted in the lesson introduction.

3. correctly list the 4 parts of the upper respiratory system.

4. briefly explain the function of cilia.

5. correctly list the 4 parts of the lower respiratory system.

6. accurately explain the process of gas exchange that occurs at the alveoli.

7. briefly explain how upper respiratory infections are often self-perpetuating conditions in PWAs.

8. briefly explain why lower respiratory infections are more dangerous to PWAs than upper respiratory infections.

9. correctly identify one way HIV's affects on the lymph system, immune system, or GI system indirectly affects the functioning of the respiratory system.

10. correctly list 5 of the 8 common symptoms related to disorders of the respiratory system.

11. correctly identify the major symptoms of OIs associated with this system, as listed on Appendix G.

MATERIALS NEEDED:

General supplies needed include:

- chalk board, dry erase board, or newsprint pads
- markers
- masking tape
- pens and pencils
- paper for taking notes (if students do not have notebooks)

Lesson plan
Student guide
Lesson quiz
Chart HIV Disorders of the Respiratory System

KEY TERMS:

alveoli	bronchial tree	cilia
diaphragm	larynx	lower respiratory infection
lungs	pathogens	pharynx
trachea	upper respiratory infection	

PROCESS:

Introduction:

The respiratory system has two functions. The first is to trap and push out any unwanted substances (e.g., microorganisms, mold, pollen, and other pollutants) that are taken in during respiration. The second is to breath in oxygen (O2), exchange O2 for carbon dioxide (CO2) in the blood, and blow the CO2 out of the body.

The respiratory system is one of the most frequent sites of HIV-related OIs. This is because the air we breathe is full of disease causing organisms called pathogens. As the immune system becomes increasingly compromised, these pathogens are able to cause infection in the respiratory system.

Respiratory infection is still the leading cause of death for PWAs. Preventative treatment is more common today and has reduced the frequency of respiratory infections for most PWAs. However, there are factors such as hydration, smoking habits, nutritional condition, exposure to pathogens, and D & A abuse that increase the risk of respiratory infections for any individual, regardless of HIV status.

Still, the single most influential factor in the number of respiratory infections in any PWA is the number of functional T cells available to launch an affective immune response against pathogens.

Lecture:

I. Structure and Function of the Respiratory System

A. Upper respiratory system

1. consists of the: nose, mouth, throat (pharynx), and the voice box (larynx).

2. These structures are all heavily lined with cells that secrete thick mucous to trap the largest pathogen particles taken in through respiration.

3. These structures are also covered by hair that act as a further trap.

a) long hair, as in the nose, catches the larges pathogen particles.

b) tiny hairs, called cilia, in the mouth, throat, and larynx continually moves in a wave-like motion toward the outside of the body. When smaller pathogen particles are trapped by the cilia, they are moved up and out of the body.

B. Lower respiratory system consists of the trachea, bronchial tree, lungs, and diaphragm

[It may be helpful to think of the lower respiratory system as an upside down tree.]

1. the trachea and bronchial tree are both lined with mucous cells and cilia.

a. there is only one trachea. It is wide at the top (just below the voice box) and gets smaller as it descends into the chest.

(1.) it is made primarily of cartilage.

(2.) the primary function of the trachea is to act as a tunnel for air as it moves in and out of the respiratory system.

[The trachea is the trunk of the tree.]

(3.) there is a right and left bronchial tree.

(a) each bronchial tree breaks into smaller and smaller tubules. The smallest tubules are about the size of a sewing needle.

[The bronchial trees are like two large branches coming off the trunk. Each of these branches breaks into many smaller branches, which breaks into even more, even smaller branches.]

b) the lungs contain air sacs (like small balloons) at the ends of the smallest tree branches.

[Think of these sacs as the leaves coming off the smallest tree branches.]

(1) it is in these tiny air sacs, called alveoli, that the gases (O2 and CO2) are exchanged.

(2.) a capillary network (from the pulmonary circulation) is wrapped on the outside of each air sac.

(3.) the cell walls of the capillary and alveoli are extremely thin and in very close proximity.

(4.) during inspiration (breathing in) O2 moves from the alveoli into the blood and CO2 moves from the blood into the alveoli.

(5.) during exhalation (breathing out), CO2 is blown out of the lungs.

c) the diaphragm is a large flat muscle that separates the chest cavity from the abdominal cavity.

(1) the diaphragm is responsible for 75% of the force used in breathing.

(2) the muscles between the lungs are responsible for the other 25%.

[NOTE: If the air we breathe does not make it all the way down the bronchial tree to the alveoli, no O2 exchange can occur. Any infection of the lower respiratory system can cause swelling around the small bronchial airways and block air from getting to the alveoli.]

II. Direct Affects of HIV on the Respiratory System

A. Upper Respiratory Infections

1. upper respiratory infections (such as sinusitis) occur more frequently as PWAs become more immune compromised.

2. chronic upper respiratory infections affect respiratory function by reducing air flow through the nose. this forces mouth breathing.

a. air coming in through the mouth is not filtered as it would be if it passed through the hairs of the nose. therefore more pathogens are taken into the respiratory system

b. mouth breathing, leading to upper respiratory infections, leading to mouth breathing is a self perpetuating problem.

c. finding ways of breaking the cycle is important. for example:

(1) keep nose clear through blowing.

(2) stay well hydrated so mucous is thinner and moves out of the sinuses more easily.

(3) antihistamines may be needed to open sinuses and help them drain.

(4) keep allergies under control. as nasal swelling is a symptom.

B. Lower Respiratory Infections

1. these are much more serious and destructive to the respiratory system

2. the degree of tissue destruction resulting from these infections is related to many things:

a) the type and frequency of respiratory infections

b) the response to treatment

c) the condition of the lungs in general (e.g., past history of smoking, asthma, bronchitis, etc.)

3. as the immune system become increasingly compromised respiratory infections increase in frequency and severity.

4. this ultimately results in permanent destruction of the alveoli

a. scar tissue replacing the cells that exchange gases.

b. or the alveoli actually explode.

(1) with fewer alveoli, there is less oxygen coming into the body for cells to do their work.

(2) at the same time, carbon dioxide builds up in the blood and cells. This limits the functioning and life of cells.

(3) the lung cells are affected by this condition just like the rest of the body; cell destruction further reduces the functioning of the lung.

III. Indirect Affects of HIV on this system

A. As HIV progresses, more of the body becomes affected.

B. Below are some of the affects HIV has on other systems, and the significant impact on the respiratory system

HIV Affects	Impact on Respiratory System
Immune system	• Increase in OIs of the upper and lower respiratory system
Lymph system	• As lymph nodes in the lungs become less functional, less clean-up and filtering of antigens occur • Lung cells and surrounding fluid become filled with debris which interferes with function and repair
GI system	• Water and nutrients become limited to the lung cells • This tends to increases the severity of OIs • If GI problem causes abdominal swelling, this puts pressure on the diaphragm and decreases the amount of air that is taken in at inspiration.
Dehydration	• Fluid is lost with mouth breathing and faster breathing caused by low O2 • Mucous becomes thicker • Trapped antigens stay in the lungs and have the opportunity to multiply and cause illness • Makes the normal healing process of the lungs more difficult. The lung cells do not have the water necessary to repair and clean themselves

IV. Common Opportunistic Infections (See Chart for Details)

A. Pneumocystis carinii pneumonia

B. Pulmonary Tuberculosis

C. Disseminated Tuberculosis

D. Candidiasis

E. Coccidiomycosis

F. Hairy Leukoplakia

V. Common Symptoms Related To Disorders Of This System

A. Cough: moist, productive or dry

B. Chills

C. Difficulty breathing

D. Shortness of breath

E. Night sweats

F. Chest pain

G. High fever

H. Gray color to skin, nail beds, and mucous membranes

HANDOUTS

Chart HIV Disorders of the Respiratory System (attached)

EVALUATION

Student quiz

SUPPLEMENTAL ACTIVITIES

Reading, No Time to Wait: Chapter 13 & 14

Handouts/Skills/ Materials:

Not Included:

- Count respiratory rate
- Basic assessment of respiratory effort and capacity
- Differentiate "types" of coughs (moist & dry)
- Identify cyanosis
- Use and precautions of: Home oxygen administration
- Oxygen equipment used in-home
- Identify constitutional symptoms and discuss appropriate actions
- Palpate for enlarged nodes
- Home care of IV lines
- How to take blood pressure and pulse

Included:

- Discuss stress management techniques with clients (Appendix D)

Disorders of the Respiratory System

Common HIV disorders	Cause	Symptoms/ Diagnosis	Comments/ Treatment
***Pneumocystis carinii* pneumonia**, (PCP) **# 1 OI**	Protozoan parasite.	Dry cough, shortness of breath, difficulty breathing, fever, night sweats, weight loss, fatigue, chest pain, sputum production in late disease. Presumptive diagnosis Chest X-ray, sputum cultures, gallium scan, bronchoscope, Blood gases (blood work)	This is the most commonly diagnosed AIDS OI. Is found in air, water, and soil and is carried by domestic animals and rodents, and may be latent. Primary site of disease is lungs, but infection sometimes spreads to spleen, lymph nodes, and blood and, rarely, to the bone marrow and liver. Bactrim, Septra, IV pentamidine, dapsone
Tuberculosis, pulmonary (TB in the lungs) **# 4 OI**	*Mycobacterium tuberculosis.* TB is contagious. Non-contagious several days after treatment begins	Fever, cough, spitting up blood, night sweats, weight loss, fatigue, swollen lymph nodes. Symptoms resemble those of PCP. PPD skin test must be done. A sputum and/or X-ray is necessary.	The mycobacterium is present in sputum droplets, released into the air by coughing. Poor air circulation can increase chances of exposure. Long-term exposure via roommates holds the greatest risk. INH (isoniazid), ethambutol, pyrazinamide, rifampin, streptomycin Combined therapy (2-4 drugs) for one year AND three negative sputum cultures
M. tuberculosis, disseminated or extra-pulmonary **# 4 OI**	As above	Symptoms and diagnosis dependent upon system infected.	Among HIV+'s, at least half the TB cases involve sites outside the lungs. The central nervous system and lymphatic systems are often involved. Additional treatment depends of system affected

Disorders of the Respiratory System

Common HIV disorders	Cause	Symptoms/ Diagnosis	Comments/ Treatment
Candidiasis (thrush) - AIDS diagnosing only when affecting the esophagus, bronchi, trachea, or lungs. **# 8 OI**	Fungus. Non-contagious.	A quick-growing fungus appearing in the mouth, esophagus, lungs. bronchi, trachea, pharynx, oral and vaginal mucous, skin, and gastrointestinal tract. Mouth: white coating in the mouth. Vagina: burning, itching, white discharge and coating, odor, redness, pain during intercourse. Esophagus: pain, difficulty swallowing. Presumptive Culture	Can appear wherever the skin or mucous membrane is damaged, including IV therapy and pressure-monitoring sites. Only an AIDS-diagnosing disease when it affects the esophagus, bronchi, trachea, or lungs. Can cause pain and wasting when it interferes with eating and swallowing.
Coccidiomycosis (disseminated or extra-pulmonary)	Fungus.	Nonspecific symptoms: malaise, weight loss, fatigue, cough. Definitive: sputum obtained by bronchoscope	Mostly infects the lungs, but in an advanced form the disease can affect the kidneys, spleen, lymph nodes, brain, and thyroid gland. Treated with antifungal drugs, and symptomatic related to the system infected
Hairy Leukoplakia **# 13 OI**	Unknown viral agent. Non-contagious	White patches in the mouth, usually on the tongue. Presumptive: visual exam	Can be confused with thrush, which has a similar appearance in the mouth. However, thrush can usually be brushed off the tongue, while hairy leukoplakia cannot. The treatments for thrush and hairy leukoplakia are very different. Zovirax (acyclovir)

THE RESPIRATORY SYSTEM AND HIV

Name: _____ Date: _____

PART I - True or False

Directions: Read each statement carefully. In the space provided, write the word "True" if the statement is true, or write the word "False" if the statement is false

_____ 1. The lower respiratory system contains the trachea, bronchial tree, lungs, and diaphragm.

_____ 2. Upper respiratory infections inhibit mouth breathing, which leads to a quick recovery for most PWAs.

_____ 3. In general, lower respiratory infections are more dangerous to PWAs than upper respiratory infections.

_____ 4. Dehydration indirectly affects the respiratory system by causing mucous to thicken, trapped antigens to stay in the lungs, and inhibiting the normal healing process of the lungs.

PART II - Short Answer

Directions: Read each item carefully. In the space provided, write a brief answer that addresses all aspects of the question.

5. Briefly define the following key terms from this lesson:

a) cilia _____

b) pathogen _____

c) alveoli _____

6. Correctly identify the major symptoms of the following respiratory OIs

a) PCP _____

b) Candidiasis _____

c) Pulmonary TB _____

7. List 5 of the common symptoms related to disorders of the respiratory system that were named in the lecture:

a) _____

b) _____

c) _____

d) _____

e) _____

THE RESPIRATORY SYSTEM AND HIV

WHY STUDY THE RESPIRATORY SYSTEM?:

The body's health is dependent upon the proper functioning of the respiratory system. HIV both directly and indirectly affects this system. With an understanding of the structure, function, and affects of HIV on the respiratory system, service care providers will be better able to understand and respond to health and life threatening conditions pertaining to respiration.

LESSON OBJECTIVES:

At the completion of this lesson, students will:

1. have learned the definitions of the lesson's key terms, so that they can correctly identify and/or define those terms presented on the chapter quiz.

2. list the two functions of the respiratory system as noted in the lesson introduction.

3. correctly list the 4 parts of the upper respiratory system.

4. briefly explain the function of cilia.

5. correctly list the 4 parts of the lower respiratory system.

6. accurately explain the process of gas exchange that occurs at the alveoli.

7. briefly explain how upper respiratory infections are often self-perpetuating conditions in PWAs.

8. briefly explain why lower respiratory infections are more dangerous to PWAs than upper respiratory infections.

9. correctly identify one way HIV's affects on the lymph system, immune system, or GI system indirectly affects the functioning of the respiratory system.

10. correctly list 5 of the 8 common symptoms related to disorders of the respiratory system.

11. correctly identify the major symptoms of OIs associated with this system, as listed on Appendix G.

KEY TERMS:

alveoli	bronchial tree	cilia
diaphragm	larynx	lower respiratory infection
lungs	pathogens	pharynx
trachea	upper respiratory infection	

LESSON CONTENT (SUMMARY):

Introduction:

The respiratory system has two functions. The first is to trap and push out any unwanted substances (e.g., micro-organisms, mold, pollen, and other pollutants) that are taken in during respiration. The second is to breath in oxygen (O2), exchange O2 for carbon dioxide (CO2) in the blood, and blow the CO2 out of the body.

The respiratory system is one of the most frequent sites of HIV-related OIs. This is because the air we breathe is full of disease causing organisms, called pathogens. As the immune system becomes increasingly compromised, these pathogens are able to cause infection in the respiratory system.

Respiratory infection is still the leading cause of death for PWAs. Preventative treatment is more common today and has reduced the frequency of respiratory infections for most PWAs. However, there are factors such as: hydration, smoking habits, nutritional condition, exposure to pathogens, and D & A abuse that increase the risk of respiratory infections for any individual, regardless of HIV status.

Still, the single most influential factor in the number of respiratory infections in any individual PWA is the number of functional T cells available to launch an affective immune response against pathogens.

Content Outline:

I. Structure and Function of the Respiratory System

A. Upper respiratory system consists of: the nose, mouth, throat (pharynx), and the voice box (larynx).

B. Lower respiratory system consists of: the trachea, bronchial trees, lungs, and diaphragm.

II. Direct Affects of HIV on the Respiratory System

A. Upper Respiratory Infections

B. Lower Respiratory Infections

III. Indirect Affects of HIV on this system

HIV Affects	Impact on Respiratory System
Immune system	• Increase in OIs of the upper and lower respiratory system
Lymph system	• As lymph nodes in the lungs become less functional, less clean-up and filtering of antigens occur • Lung cells and surrounding fluid become filled with debris which interferes with function and repair
GI system	• Water and nutrients become limited to the lung cells • This tends to increases the severity of OIs • If GI problem causes abdominal swelling, this puts pressure on the diaphragm and decreases the amount of air that is taken in at inspiration.
Dehydration	• Fluid is lost with mouth breathing and faster breathing caused by low O2 • Mucous becomes thicker • Trapped antigens stay in the lungs and have the opportunity to multiply and cause illness • Makes the normal healing process of the lungs more difficult. The lung cells do not have the water necessary to repair and clean themselves

IV. Common Opportunistic Infections

A. Pneumocystis carinii pneumonia

B. Pulmonary Tuberculosis

C. Disseminated Tuberculosis

D. Candidiasis

E. Coccidiomycosis

F. Hairy Leukoplakia

V. Common Symptoms Related To Disorders Of This System

As a result of training, my clients feel I'm knowledgeable about HIV and the medication they are taking. The client is more vocal about the medicine. The clients now ask me questions about the Protease Inhibitors. The families have a lot of trust in me.

Irene Lindsey
Case Manager Assistant
ActionAIDS

THE NERVOUS SYSTEM AND HIV

RATIONALE:
HIV both directly and indirectly affects the nervous system. With an understanding of the structure, function, and affects of HIV on this system, service care providers will be better able to understand and respond to medical and home care needs of HIV infected individuals that result from damage to this system.

GOALS:
1. Students will learn the structure and function of the nervous system.

2. Students will learn the direct and indirect affects HIV has on the nervous system.

OBJECTIVES:
At the completion of this lesson, students will:

1. know the definitions of the lesson's key terms, so that they can correctly identify and/or define those terms presented on the chapter quiz.

2. correctly differentiate the cerebrum and cerebellum by making reference to at least 2 functions of each.

3. list at least 3 vital functions controlled by the brain stem.

4. briefly explain the blood-brain barrier as a system designed to make the brain less vulnerable to pathogens.

5. briefly explain the structure and function of myelin.

6. correctly identify the direct affect HIV has on the nervous system by making reference to pathogens crossing the blood-brain barrier and destroying myelin.

7. identify dehydration and drug interactions as the indirect affects of HIV on the nervous system.

8. correctly identify the major symptoms of OIs associated with this system, as listed on Appendix G.

9. correctly identify at least 3 motor symptoms, cognitive symptoms, and constitutional symptoms that may signal nervous system disorders.

10. correctly perform a neurologic assessment, using the 6 criteria presented in the handout "Neurologic Assessment".

MATERIALS NEEDED:

General supplies needed include:

- chalk board, dry erase board, or newsprint pads
- markers
- masking tape
- pens and pencils
- paper for taking notes (if students do not have notebooks)

Lesson plan
Student guide
Lesson quiz
Chart: Common HIV Related Disorders
Assessing neurological status

KEY TERMS:

afferent	autonomic nervous system	blood-brain barrier
brain stem	central nervous system	cerebellum
cerebrum	cranial nerves	efferent
lobes	myelin	neuralgia
neurons	peripheral nervous system	spinal cord
spinal nerves		

PROCESS:

Introduction:

The nervous system coordinates all the body's functions and allows individuals to adapt to changes in their internal and external environment.

The nervous system consists of the central nervous system (CNS), which includes the brain and spinal cord, and the peripheral nervous system (PNS) which includes the cranial nerves, spinal nerves, and the autonomic system.

The nervous system consists of two types of cells: neurons and neuroglia. These cells are found in both the CNS and PNS. Neurons are conducting cells; they send and receive messages. Neuroglia cells serve as the support cells specifically for neurons; they provide fluid, nourishment, protection, and clean up waste. This separate support system allows the nervous system to be less vulnerable to resource depletion, infection, and injury than other systems.

Motor and cognitive functioning are both affected by HIV infection. As with most HIV-related destruction, the affect on the brain and nervous system are related to the level of compromise of the immune system and other co-factors.

According to studies completed prior to the introduction of protease inhibitors, some level of motor and/or cognitive impairment can be detected in 55-56% of all PWAs. At autopsy, HIV was found in the brains of 90% of individuals who died of AIDS- related causes. It is hoped that the addition of protease inhibitors and other new drugs to treatment regiments will reduce the number and severity of brain cell infections.

Lecture:

I. Structure and Function of System

A. Central Nervous System (CNS) contains the brain and spinal cord

1. the brain has 3 main parts:

a. the cerebrum

(1) the largest part of brain.

(2) divided into four sections, or lobes, on each side.

(3) controls higher functions in humans including:

(a) capacity for personality, judgment, abstract reasoning, and social behavior.

(b) language expression and language comprehension.

(c) interpretation and integration of sensations (e.g., pain, temperature, and touch).

(d) interpretation of size, shape, distance, and texture.

(e) interpretation of visual and hearing stimuli.

b. the cerebellum

(1) maintains muscle tone,

(2) coordinates muscle movements,

(3) and controls balance.

c. the brain stem

(1) is located at the base of the brain.

(2) is divided into three parts.

(3) controls the lower functions, sometimes called vital functions, including:

(a) respiratory function (e.g., the stimulation to breathe and the frequency and depth of breathing depends on the chemical messages from the body to the brain stem about O2 needs).

(b) cardiac functions (e.g., the stimulation of the heart to beat and the frequency and force of the heartbeat depend on chemical messages from the body to the brain stem).

(c) mediates auditory information (e.g., we jump and look towards an alarming sound without thinking).

(d) mediates visual reflexes (e.g., when something begins to fall from a counter next to us, we reach to catch it without thinking).

(e) mediates vasomotor reactions. This is the expansion or contraction of the blood vessels in our muscles in response to a sudden need.

i) this can result in more blood and O2 being sent to the muscles during times of exertion.

ii) less blood and O2 being sent to muscles when the vital organs of the body are threatened.

(f) controls the functions of all organs, in normal conditions, as well as emergency conditions (e.g., the secretion of hormones that maintain a pregnancy for nine months; releasing adrenaline in emergency situations; release of enzymes for all body functions)

2. since the brain is so vital to life, it has a special system, called the blood-brain barrier, set up to make sure the brain is less vulnerable to limited resources and invasion of pathogens than the rest of the body.

a. the brain has "top priority" for all available O2, H2O, and dietary nutrients.

b. the brain has a unique filtering process, at the capillary level, to keep out harmful substances.

[NOTE: the lymph and immune system provide the work for this filtering process.]

3. the spinal cord:

a. is an extension of the brain.

b. is the pathway for messages from the body to the brain. These are called efferent messages.

c. is the pathway for messages from the brain to the body. These are called afferent messages.

d. is the center for spinal cord reflexes (e.g., knee jerk, retracting from pain).

e. is the source of motor commands to muscles below the head (e.g., initial messages come from cells in the spinal cord and then travel along the spinal nerves to muscles).

f. is the receiver of sensory input below the head (e.g., when someone touches your back, the sensation travels from nerves in the back, to the spinal cord, to the brain where touch is interpreted).

B. The Peripheral Nervous System (PNS) contains the cranial nerves, spinal nerves, and autonomic nervous system.

1. cranial nerves

a. there are 12 pairs of cranial nerves.

b. these transmit motor and sensory messages between brain, head and neck.

2. spinal nerves

a. there are 31 pairs of nerves coming out of the spinal cord.

b. each nerve carries messages to and from a particular region of the body to control muscle activities.

(1) the chest has 7 spinal nerves assigned to each side.

(2) each arm has one spinal nerve.

(3) each leg has 3 spinal nerves.

3. autonomic nervous system

a. these are nerves that originate from the brain stem.

b. they control the functioning of all organs in the body.

c. they implement the orders from the brain stem for the regulation of vital signs, secretion of hormones and digestive enzymes in both normal and emergency conditions.

C. Myelin

1. this is a lining of fat that covers neuroglia cells.

2. myelinated cells are found in all areas of the nervous system, both the CNS and PNS.

3. myelin speeds electrical impulses along nerve fibers.

II. Direct Affects of HIV on System

A. HIV can cross the blood-brain barrier through infected macrophages.

B. Macrophages are normally allowed in to protect the brain against foreign invaders

1. through a process not well understood, myelin is destroyed in the presence of HIV

a. with destruction of myelin comes a slowing of messages through the nerve fibers.

b. messages can get distorted as they pass through a damaged nerve.

c. distortion could affect any function, movement or behavior of the body.

2. HIV further compromises the blood-brain barrier through general compromising of the immune and lymphatic system.

a. this allows other organisms to enter and grow in the brain, producing OIs.

b. with infection comes cell destruction. The more frequent and the more severe the infection, the more brain cell damage occurs.

c. OIs result in further impairment of motor and cognitive functions of the body.

III. Indirect Affects of HIV on this system

A. Dehydration

1. low O2 levels and limited nutrients, resulting from other HIV-related disorders, will affect the brain less than the rest of the body (as discussed above).

2. over time, however, these critical elements can become so low in the blood that even the brain gets depleted. This will affect all functions performed by the brain.

B. Drugs given for HIV infection and related OIs also indirectly affect the CNS and PNS. Drug side affects can result in:

1. slowing or speeding messages along nerves.

2. changing the chemical reactions that allow interpretation of messages. This results in inaccurate information getting to the body from the brain.

IV. Common OIs (See chart for more details)

A. Toxoplasmosis (toxo)

B. Crytococcal infection (crypto meningitis)

C. HIV-associated dementia (HAD)

D. Peripheral neuropathy

(Less common OIs include:)

E. Cytomegalovirus infection (CMV): of CNS and/or eyes

F. Progressive multifocal leukoencephalopathy (PML)

G. Herpes

H. TB

I. Neurosyphilis

V. Common Symptoms of Nervous System Disorders

A. Motor Symptoms:

1. muscle weakness

2. loss of balance

3. loss of motion or feeling on one side of the body

4. seizures

5. change in vision

6. slowed muscle movement

B. Cognitive Symptoms:

1. confusion

2. memory problems

3. behavior changes

a. mood swings

b. apathy

c. loss of interest

4. language difficulties in speaking or understanding

C. Constitutional Symptoms:

1. fever

2. headache

3. lethargy

4. night sweats

5. nausea and vomiting

6. weight loss

HANDOUTS

Chart HIV Disorders of the Neurological System
Assessing neurological status

EVALUATION

Student quiz

SUPPLEMENTAL ACTIVITIES

Reading, No Time to Wait: Chapters 9 & 10

Handouts/Skills/ Materials:

Not Included:

Assessing neurological status (based on handout)
Establish "baseline orientation"
Identify comparative signature affected by neurological changes
Identify constitutional symptoms and discuss appropriate actions
Home care of IV lines
How to take blood pressure and pulse
Basic assessment of respiratory effort and capacity

NEUROLOGICAL ASSESSMENT

As HIV+ individuals are living longer, more of the neurological affects of HIV are manifesting. The areas of neurological functions affected by HIV can be put into one of six categories. These important categories are:

Orientation: to time, location, date, address, etc.

Memory Cognition: able to keep a train of thought, remember instructions, etc.

Motor: balance, handwriting, coordination, speed of reflexes

Behavior and Affect: mood swings, behavioral changes, becoming disinterested in life (often mistaken for depression), etc.

Problem Solving: simple or common tasks become overwhelming

Daily Activities (ADLs): unable to maintain hygiene, prepare meals, or clean living space (usually due to fatigue)

Anyone working with HIV+ individuals needs to be as alert to changes in these areas as with any of the more common early warning signs (like cough, weight loss, diarrhea, or recurrent infections of any kind).

Disorders of the Neurological System

Common HIV disorders	Cause	Symptoms	Comments
Lymphomas (Primary brain/spinal chord lymphoma, systemic non-Hodgkin's lymphoma, Hodgkin's disease) **# 17 OI**	Lymphoma is sixty times more common in AIDS patients than in immune competent individuals.	CNS: paralysis of one side of the body, loss of ability to speak or understand language, confusion, memory loss, seizures, apathy, lethargy; in some cases a headache is the only symptom.	On MRI and CAT scans, the lesions of primary lymphoma in the brain can be confused with those of toxoplasmosis of the brain. Both single and multiple lesions are seen. Primary lymphoma in the brain is usually a late complication of AIDS and difficult to treat.
Cryptococcosis, extra-pulmonary (Cryptococcocal meningitis) **# 7 OI**	Fungus.	Most commonly affects the brain. Also affects lungs and other organs. In lungs, can cause a form of pneumonia mimicking or occurring with PCP. Mental confusion, intermittent low-grade fevers, progressive weakness, fatigue, headache, nausea, vomiting, meningeal signs (double vision; stiff neck), memory loss, altered mental state, seizures (rare).	Often in soil contaminated with bird excrement. It is usually acquired by inhalation.

Disorders of the Neurological System

Common HIV disorders	Cause	Symptoms	Comments
Cytomegalovirus disease (CMV), cytomegalovirus retinitis **# 6 OI**	A herpes virus found in saliva, semen, cervical secretions, urine, feces, blood, and breast milk.	General: fever, profound tiredness, muscle and joint aches, night sweats. Retinitis (eyes): blurry eyesight leading to blindness, floating spots, loss of peripheral vision, blind spots. Esophagus (throat): pain, difficulty swallowing, ulceration. Colitis (colon): fever, diarrhea, abdominal pain, wasting pneumonia (rare); see PCP for symptoms. Liver: hepatitis.	Some terminology: In eyes- CMV retinitis. In colon - CMV colitis. In lungs - CMV pneumonia. In brain - CMV Encephalopathy. This is one of the most commonly diagnosed underlying conditions that is a cofactor in HIV progression. CMV and other herpes viruses may be responsible for a significant amount of damage to the immune system well before those viruses are recognized or diagnosed. Using Zovirax is recommended for prevention.
HIV Encephalopathy (dementia, dementia complex, AIDS dementia syndrome, HIV-associated dementia [HAD]) **# 11 OI**	HIV in the brain.	Neurological problems, including decreased concentration, slowed thought, loss of interest, slowed motor movements. Balance, memory problems, slurred speech; personality changes. In children, loss of developmental milestones.	HIV+ children are frequently affected. Peptide I shows signs of resolving this condition.
Neuropathy	HIV causes this condition. It can be the result of drug toxicity's; ddC and ddI. Non-contagious.	Pain, tingling, numbness in feet and legs, sometimes hands and fingers. Pain may be severe and walking difficult.	Neuropathy may be a side affect of a current treatment. Peptide T is currently the best treatment for neuropathy.

Disorders of the Neurological System

Common HIV disorders	Cause	Symptoms	Comments
Progressive multifocal leukoencephalopathy (PML)	Virus, JC virus.	Memory loss, motor-control problems, seizures, mood changes, neurological symptoms and signs (e.g.,, weakness of one limb or one side of the body, loss of vision on one side, loss of feeling on one side or in one limb, language problems, unsteadiness).	Profound dementia can result from advanced disease.
Toxoplasmosis of the brain **# 3 OI**	Protozoan. Passed by contact with Toxo-infected cats and ingestion of raw or undercooked meat or unpasteurized dairy products. Non-contagious.	Produces lesions in the central nervous system, so symptoms are neurological: headaches, fever, chills, motor changes, lethargy, confusion, seizures, paralysis on one side of the body, delusions, sensory loss, tremor, palsy, blindness, personality changes, disorientation, coma. Heart and lung symptoms are also possible.	The organism accounts for the most widespread latent central-nervous-system infection in the world. The antibody test is not definitive.

THE NERVOUS SYSTEM AND HIV

Name: _____ Date: _____

PART I - True or False

Directions: Read each statement carefully. In the space provided, write the word "True" if the statement is true, or write the word "False" if the statement is false

_____ 1. The cerebrum controls higher functions in humans, while the cerebellum controls muscle tone and balance.

_____ 2. The brain stem controls vital functions, such as cardiac functions and mediating auditory and visual information.

_____ 3. Efferent messages go from the brain to the body while afferent messages go from the body to the brain.

_____ 4. HIV cannot cross the blood-brain barrier. This is one of the reasons why the nervous system is so well protected against affects of HIV.

_____ 5. Indirect affects of HIV on the nervous system can result from dehydration and drug interactions.

PART II - Short Answer

Directions: Read each item carefully. In the space provided, write a brief answer that addresses all aspects of the question.

6. Define the following key terms:

a) neurons _____

b) neuralgia cells _____

7. Briefly explain the significance of the blood-brain barrier

8. Briefly explain the structure and function of myelin:

9. List 3 common motor symptoms of nervous system disorders

a) _____

b) _____

c) _____

10. List 3 common constitutional symptoms of nervous system disorders

a) _____

b) _____

c) _____

THE NERVOUS SYSTEM AND HIV

WHY STUDY THE NERVOUS SYSTEM?:
HIV both directly and indirectly affects this system. With an understanding of the structure, function, and affects of HIV on this system, service care providers will be better able to understand and respond to medical and home care needs of HIV infected individuals that result from damage to this system.

LESSON OBJECTIVES:
At the completion of this lesson, students will:

1. learn the definitions of the lesson's key terms, so that they can correctly identify and/or define those terms presented on the chapter quiz.

2. correctly differentiate the cerebrum and cerebellum by making reference to at least 2 functions of each.

3. list at least 3 vital functions controlled by the brain stem.

4. briefly explain the blood-brain barrier as a system designed to make the brain less vulnerable to pathogens.

5. briefly explain the structure and function of myelin.

6. correctly identify the direct affect HIV has on the nervous system by making reference to pathogens crossing the blood-brain barrier and destroying myelin.

7. identify dehydration and drug interactions as the indirect affects of HIV on the nervous system.

8. correctly identify the major symptoms of OIs associated with this system, as listed on Appendix G.

9. correctly identify at least 3 motor symptoms, cognitive symptoms, and constitutional symptoms that may signal nervous system disorders.

10. correctly perform a neurologic assessment, using the 6 criteria presented in the handout "Neurologic Assessment".

KEY TERMS:

afferent	autonomic nervous system	blood-brain barrier
brain stem	central nervous system	cerebellum
cerebrum	cranial nerves	efferent
lobes	myelin	neuralgia
neurons	peripheral nervous system	spinal cord
spinal nerves		

LESSON CONTENT (SUMMARY):

Introduction:
The nervous system coordinates all the body's functions and allows individuals to adapt to changes in their internal and external environment.

The nervous system consists of the central nervous system (CNS), which includes the brain and spinal cord, and the peripheral nervous system (PNS) which includes the cranial nerves, spinal nerves, and the autonomic system.

The nervous system consists of two types of cells, neurons and neuroglia. These cells are found in both the CNS and PNS. Neurons are conducting cells; they send and receive messages. Neuroglia cells serve as the support cells specifically for neurons; they provide fluid, nourishment, protection, and clean up waste. This separate support system allows the nervous system to be less vulnerable to resource depletion, infection, and injury than other systems.

Motor and cognitive functioning are both affected by HIV infection. As with most HIV-related destruction, the affect on the brain and nervous system are related to the level of compromise of the immune system and other co-factors.

According to studies completed prior to the introduction of protease inhibitors, some level of motor and/or cognitive impairment can be detected in 55-56% of all PWAs. At autopsy, HIV was found in the brains of 90% of individuals who died of AIDS- related causes. It is hoped that the addition of protease inhibitors and other new drugs to treatment regiments will reduce the number and severity of brain cell infections.

Lesson Outline:

I. Structure and Function of System

A. Central Nervous System (CNS) contains the brain and spinal cord

1. since the brain is so vital to life, it has a special system, called the blood-brain barrier, set up to make sure the brain is less vulnerable to limited resources and invasion of pathogens than the rest of the body

B. The Peripheral Nervous System (PNS)contains the cranial nerves, spinal nerves, and autonomic nervous system

C. Myelin

II. Direct Affects of HIV on System

A. HIV can cross the blood-brain barrier through infected macrophages.

B. Macrophages are normally allowed in to protect the brain against foreign invaders.

III. Indirect Affects of HIV on this system

A. Dehydration

B. Drugs given for HIV infection and related OIs also indirectly affect the CNS and PNS.

IV. Common OIs

A. Toxoplasmosis. (toxo)

B. Crytococcal infection (crypto meningitis)

C. HIV-associated dementia (HAD)

D. Peripheral neuropathy

(Less common OIs include:)

E. Cytomegalovirus infection (CMV): of CNS and/or eyes

F. Progressive multifocal leukoencephalopathy (PML)

G. Herpes

H. TB

I. Neurosyphilis

V. Common Symptoms of Nervous System Disorders

A. Motor Symptoms

B. Cognitive Symptoms

C. Constitutional Symptoms

As a result of medical training, my clients relate to me better and feel more comfortable when they ask me questions. I feel more valuable in my position as a CMA. When I do see a client, I feel that I'm there for more than just practical reasons.

Linda Sallard
Case Manager Assistant
ActionAIDS

THE SKIN AND HIV

RATIONALE:

The skin is the largest organ. It is also one that is affected by HIV infection. Service care providers who understand the structure, function, and affects of HIV on the skin will be better equipped to assist PWAs develop and maintain a health care plan that includes careful attention to the skin.

GOALS:

1. Students will learn the structure and function of the skin.

2. Students will learn the affects HIV has on the skin.

OBJECTIVES:

At the completion of this lesson, students will:

1. know the definitions of the lesson's key terms, so that they can correctly identify and/or define those terms presented on the chapter quiz.

2. correctly name the 2 layers of the skin as the dermis and epidermis.

3. correctly list and/or identify the functions at least 4 of the following 6 structures of the dermis: hair, oil glands, sweat glands, nerves, capillary network, and lymphatic capillaries.

4. accurately list the indirect effect HIV has on the skin by referring to HIV's affects on any 2 of the following systems: immune, nervous, respiratory, and/or GI.

5. correctly identify the major symptoms of OIs associated with this system, as listed in the attached OI chart.

MATERIALS NEEDED:

General supplies needed include:

- chalk board, dry erase board, or newsprint pads
- markers
- masking tape
- pens and pencils
- paper for taking notes (if students do not have notebooks)

Lesson plan
Student guide
Lesson quiz
Chart: Disorders of the Skin

KEY TERMS:

capillary beds	dermis	epidermis
hair	lymphatic capillaries	oil glands
sweat glands		

PROCESS:

Introduction:

The skin plays many roles. It provides protection from the elements such as water, heat and cold. Skin varies in thickness depending on the part of the body it covers and protects.

There are many different nerve receptors in the skin. Using these various receptors, the brain can interpret different messages from the exact same location on the skin, such as the touch of a feather, the pressure of a squeeze, or the pain of a needle stick.

Skin maintains a specific amount of acid (pH) on its surface to discourage the attachment and growth of pathogens. There are, however, "friendly" bacteria and fungi that reside normally on the surface of the skin. These friendly organisms keep each other in check, neither allowing the other to become dominant. This process also helps prevent the over growth of other bacteria or fungi as well. HIV affects the surface of the skin. Skin pH changes, and as a result, the balance between the normal bacteria and fungi on the skin gets out of balance. This is when we see increasing numbers and severity skin disorders.

There are a large supply of immune cells in the extracellular fluid and in the lymphatic vessels that service the skin. It is mainly in this process that HIV affects the normal functioning of the skin. As the immune system becomes more compromised, organisms enter the skin's barrier through small cuts or breaks in the skin. The immune cells needed to successfully contain the pathogen are simply not present in the required numbers.

[NOTE: This is an example of the cooperation discussed in the lesson on the immune system. It demonstrates the workings of the protective surface phenomena by the skin and the general host defense by immune cells and lymphatic vessels]

Lecture:

I. Structure and Function of the Skin

A. The Epidermis

1. the number of layers of epidermal skin depends on the abuse the area must take.

2. the eyelids have only 3-4 layers of epidermis, while the heels have 10-20 layers. Heels take much more abuse than eyelids.

3. the deepest epidermal layer acts as an anchor to the tissues beneath.

a. this layer also produces new skin cells to replace those lost through damage or abrasion.

b. these new cells mature as they move upward towards the surface of the skin.

4. when epidermal cells move towards the skin surface, they get flatter and longer.

5. at the surface layer, they overlap heavily to produce the tough surface of the skin.

B. The Dermis

1. this layer contains many structures which play a part in the function of the skin.

2. hair transports oil to the skin's surface and acts as a receptor of movement for the body.

3. oil glands secrete oil which helps keep the skin moist and also helps retain heat.

4. sweat glands help cool the body.

5. nerves convey both efferent and afferent messages.

6. capillary beds provide nutrients to the skin; help control skin temperature by expanding when hot or contracting when cold; and are rich in immune cells which aid in infection control.

7. lymphatic capillaries assist in the removal of waste and damaged or abnormal cells. This also assists in infection control.

II. Direct Affects of HIV

A. None

III. Indirect Affects of HIV

HIV Affect on other Systems	Impact on Skin
Immune system	Increase in OIs of the skin
Nervous system	The skin's ability to control body temperature is impaired; Motor and sensory messages to or from the skin, may be blocked, slowed, or distorted.
Respiratory system	O2 levels in the blood become low. This limits skin cell reproduction and slows the healing process. This allows for more OIs to occur.
GI system	Water and nutrients become limited to the skin cells because skin is considered a "low priority system". Resources are diverted from the skin to more vital systems (brain, lungs, heart, liver). This increases the risk of OIs of the skin and in the blood stream if the skin becomes dry and cracked and antigens get past the skin's barrier.

IV. Common OIs (See attached OI chart for more details)

A. Kaposi's Sarcoma (KS)

B. Herpes zoster (shingles)

C. Herpes simplex (fever blisters)

D. Genital warts

E. Histoplasmosis

F. Non-specific dermatitis

G. Chronic fungal infections

H. Idiopathic Thrombocytopenia Purpura (HIV-related low platelet count)

HANDOUTS

Chart: Disorders of the Skin

EVALUATION

Student quiz

SUPPLEMENTAL ACTIVITIES

Reading, No Time to Wait: Review chapter 16

Handouts/Skills/ Materials:

Not Included:

Identify dehydration using the skin and mouth
Identify constitutional symptoms and discuss appropriate actions
Discuss stress management techniques with clients (Appendix D)
How to take blood pressure and pulse
Basic assessment of respiratory effort and capacity
Assessing neurological status (based on handout)
Establish "baseline orientation"
Identify comparative signature affected by neurological changes

Disorders of the Skin

Common HIV disorders	Cause	Symptoms/ Diagnosis	Comments/ Treatment
Kaposi's sarcoma (KS) **# 2 OI**	A cancer. Possibly a contagious viral or bacterial sexually transmitted disease.	Purple, reddish, or brown, usually nonsymmetrical lesions on external or internal organs, sometimes accompanied by edema. Lesions mostly involve the skin, but often involve lymph nodes, oral cavity, gastrointestinal tract, and lungs. Pulmonary involvement can cause severe respiratory symptoms. Presumptive diagnosis Biopsy	Usually not life-threatening, KS is the most commonly diagnosed cancer in HIV-infected people. Adriamycin, Doxorubicin (IV) Blenoxane, Bleomycin (IV) Oncovin, Vincristine (IV) Ve Pesid, Etoposide (IV)
Herpes simplex, chronic ulcers **# 9 OI**	Virus: herpes simplex virus (HSV). Contagious when a sore is present.	Non-healing blisters lasting more than one month on skin, especially around the anus, genitals, or mouth. Lesions are painful; can burn and itch. Presumptive diagnosis Culture	Lesions may be internal. In women, a careful GYN exam is recommended. Herpes is a definite cofactor in activating HIV infection. Diagnosis and preventative treatment is recommended. Zovirax, Acyclovir Vatltex, Valacyclovir

Disorders of the Skin

Common HIV disorders	Cause	Symptoms/ Diagnosis	Comments/ Treatment
Herpes zoster (shingles) **# 9 OI**	Varicella-zoster virus (VZV) the chickenpox virus. Contagious if exposed to oozing sores.	Blisters, painful lesions that form a cluster. Presumptive diagnosis Culture	Affects the face and trunk on one side of the body. The lesions follow the paths of sensory nerves, so you can see a definite line where they stop. Zovirax, Acyclovir Vatltex, Valacyclovir
Human papillomavirus (HPV), genital warts **# 15 OI**	Virus transmitted through sexual contact.	Warts in genital area, including vagina, vulva, cervix, penis, outer anus, and anal canal.	Extremely common in HIV+ women. Laser, cryotherapy, electrocautery, excision and surgery, radiation, systemic chemotherapy

Disorders of the Skin

Common HIV disorders	Cause	Symptoms/Diagnosis	Comments/Treatment
Histoplasmosis **# 18 OI**	Fungus.	Fever, chills, muscle aches, headache, abdominal pain, weight loss, skin lesions, breathing difficulties, anemia, swollen lymph nodes. May be difficult to diagnose.	Amphotercin B, Ketoconazole, itraconazole
Idiopathic Thrombocytopenia Purpura (ITP)	Unknown. Completely non-contagious.	Excessive bleeding from nosebleeds, injuries, or cuts. Some people bruise easily. Presumptive diagnosis Platelet count, bleeding time (blood work)	Regular platelet should diagnose ITP early. It is important to treat this disorder early. Thrombin produces (clotting factors)
Non-specific dermatitis (Seborrhea, Psoriasis, severe itching)		Presumptive diagnosis	
Chronic fungal infections	Fungus overgrowth (lack of bacteria to balance)	Presumptive diagnosis Culture	Mycostatin Nizoral, Ketoconazole (IV) Nystatin (suspension) Diflucan, Mycelex

THE SKIN AND HIV

Name_____Date _____

PART I - True or False

Directions: Read each statement carefully. In the space provided, write the word "True" if the statement is true, or write the word "False" if the statement is false

_____ 1. At the skin's surface, epidermal skin cells overlap heavily to produce the tough surface of the skin.

_____ 2. The dermal layer of the skin contains structures such as sweat glands, capillary beds, and lymphatic capillaries.

_____ 3. HIV has no direct affects on the skin.

_____ 4. Skin is a high priority organ which receives excess fluids when limited fluids are available to the body.

PART II - Short Answer

Directions: Read each item carefully. In the space provided, write a brief answer that addresses all aspects of the question.

5. Briefly define the following key terms from this lesson:

a) epidermis _____

b) hair _____

c) oil glands _____

6. List a major symptom or symptoms for the following skin-related OIs.

a) Herpes simplex _____

b) Human papillomavirus _____

c) Idiopathic Thrombocytopenia Purpura _____

THE SKIN AND HIV

WHY STUDY THE SKIN?:

The skin is the largest organ. It is also one that is affected by HIV infection. Service care providers who understand the structure, function, and affects of HIV on the skin will be better equipped to assist PWAs develop and maintain a health care plan that includes careful attention to the skin.

LESSON OBJECTIVES:

At the completion of this lesson, students will:

1. learn the definitions of the lesson's key terms, so that they can correctly identify and/or define those terms presented on the chapter quiz.

2. correctly name the 2 layers of the skin as the dermis and epidermis.

3. correctly list and/or identify the functions at least 4 of the following 6 structures of the dermis: hair, oil glands, sweat glands, nerves, capillary network, and lymphatic capillaries.

4. accurately list the indirect effect HIV has on the skin by referring to HIV's affects on any 2 of the following systems: immune, nervous, respiratory, and GI.

5. correctly identify the major symptoms of OIs associated with this system, as listed on Appendix G.

KEY TERMS:

capillary beds	dermis	epidermis
hair	lymphatic capillaries	oil glands
sweat glands		

LESSON CONTENT (SUMMARY):

Introduction:
The skin plays many roles. It provides protection from the elements such as water, heat and cold. Skin varies in thickness depending on the part of the body it covers and protects.

There are many different nerve receptors in the skin. Using these various receptors, the brain can interpret different messages from the exact same location on the skin, such as the touch of a feather, the pressure of a squeeze, or the pain of a needle stick.

Skin maintains a specific amount of acid (pH) on its surface to discourage the attachment and growth of pathogens. There are, however, "friendly" bacteria and fungi that reside normally on the surface of the skin. These friendly organisms keep each other in check, neither allowing the other to become dominant. This process also helps prevent the over growth of other bacteria or fungi as well. HIV affects the surface of the skin. As pH changes the balance between the normal friendly bacteria and fungi on the skin gets out of balance. This is when we see increasing numbers and severity skin disorders.

There are a large supply of immune cells in the extracellular fluid and in the lymphatic vessels that service the skin. It is mainly in this process that HIV affects the normal functioning of the skin. As the immune system becomes more compromised, organisms enter the skin's barrier through small cuts or breaks in the skin. The immune cells needed to successfully contain the pathogen are simply not present in the required numbers.

Content Outline:

I. Structure and Function of the Skin

A. The Epidermis

B. The Dermis

II. Direct Affects of HIV

None

III. Indirect Affects of HIV

HIV Affect on other Systems	Impact on Skin
Immune system	• Increase in OIs of the skin.
Nervous system	• The skin's ability to control body temperature is impaired; • Motor and sensory messages to or from the skin, may be blocked, slowed, or distorted.
Respiratory system	• O2 levels in the blood become low. • This limits skin cell reproduction and slows the healing process. • This allows for more OIs to occur.
GI system	• Water and nutrients become limited to the skin cells because skin is considered a "low priority system". • Resources are diverted from the skin to more vital systems (brain, lungs, heart, liver). • This increases the risk of OIs of the skin and in the blood stream if the skin becomes dry and cracked and antigens get past the skin's barrier.

IV. Common OIs

A. Kaposi's Sarcoma (KS)

B. Herpes zoster (shingles)

C. Herpes simplex

D. Genital warts

E. Histoplasmosis

F. Non-specific dermatitis

G. Chronic fungal infections

H. Idiopathic Thrombocytopenia Purpura (HIV-related low platelet count)

My clients knew that I was in training because I would watch everything they did and I always had my book in my hand. My clients have a greater respect for me; they make me feel valued.

Linda Sallard
Case Manager Assistant
ActionAIDS

THE DIGESTIVE SYSTEM AND HIV

RATIONALE:

HIV's affects on the digestive system can range from bothersome to debilitating. Many PWAs will experience eating problems resulting from or bringing about digestive system complications. Service care providers who possess thorough information of the structure, function, and affects of HIV on the digestive system will be better able to spot symptoms, identify problems and offer solutions that may bring relief from these problems to HIV infected individuals.

GOALS:

1. Students will learn the structure and function of the digestive system.

2. Students will learn the direct and indirect affects HIV has on this system.

OBJECTIVES:

At the completion of this lesson, students will:

1. know the definitions of the lesson's key terms, so that they can correctly identify and/or define those terms presented on the chapter quiz.

2. correctly list and be able to briefly describe the 3 main organs and 3 accessory organs that make up the digestive system.

3. correctly differentiate between the functions of the stomach, small intestine, and large intestine by writing a 1 sentence summary of the function of each of these 3 organs.

4. correctly differentiate between the functions of the liver, gall bladder, and pancreas, by accurately listing the functions of these 3 accessory organs.

5. accurately identify the direct affects of HIV on the digestive system as infecting mucous cells, reducing immune response to pathogens, and malabsorption.

6. correctly list 6 of the 13 HIV-related eating problems that affect nutrition as presented in the lecture.

7. correctly identify the major symptoms of OIs associated with this system, as listed on Appendix G.

8. correctly list and/or identity at least 3 common symptoms of digestive system disorders as presented in the lecture.

9. correctly list and/or identify at least 4 constitutional symptoms that may signal digestive system disorders as presented in the lecture.

MATERIALS NEEDED:

General supplies needed include:

- chalk board, dry erase board, or newsprint pads
- markers
- masking tape
- pens and pencils
- paper for taking notes (if students do not have notebooks)

Lesson plan
Student guide
Lesson quiz
Chart: HIV Disorders of the GI System

KEY TERMS:

bile	gall bladder	large intestine
liver	malabsorption	pancreas
small intestine	stomach	villi

PROCESS:

Introduction:

In all of the prior lessons, the role of water and nutrients in relation to the health and repair of cells has been emphasized. It is the digestive system which is primarily responsible for ensuring these vital elements are available for the cells. This is accomplished through a complex set of events that occur at different locations along the digestive track.

The digestive system consists of the stomach, small intestine, large intestine, and three accessory organs: the liver, gall bladder, and pancreas.

The entire digestive system is heavily lined with mucous cells. These cells typically have on them a protein called gp-120 that HIV is attracted to. This is the major reason why the digestive system is so vulnerable to HIV.

Another significant factor is that the lining of the small intestine is filled with blood capillaries which facilitate the absorption of nutrients. As the intestines commonly contain numerous organisms, the immune system also keeps a large number of macrophages, T cells, B cells, and lymph nodes on hand.

[NOTE: This is another example of the cooperation between the protective surface phenomena (the intestines) and the general host defense (the immune cells and lymph nodes).] All of these general host participants also contain gp120 proteins and are frequently infected in HIV+ individuals when they come to the walls of the intestines. As micro-organisms get through the intestinal wall, the immune cells are weakened in number and ability by HIV. This allows pathogens entry into the body, in a way the body thought it had protected.

Lecture:

I. Structure and Function of Digestive System

A. The stomach is simply an expandable sac

1. the outer layer is composed of muscle

2. the middle layer is a mix of:

a. mucous cells

b. capillary beds, for blood supply

c. nerves

d. cells that secrete many different types of fluids, acids, and enzymes known as "gastric juices"

e. many WBCs to launch an immune attack if needed

3. the inner-most layer (the inside of the stomach) is covered with hundreds of tiny finger-like extensions that secrete mucous.

a. these fingers are moved by muscle to churn up the digesting food

4. functions of the stomach includes:

a. adding acid to swallowed material to enhance protein digestion and killing microorganisms

b. mechanically manipulates digesting food

c. moves the digesting food out of the stomach and into the small intestine at the proper rate

B. The small intestines are over 20 feet of long, thin walled, tubing (if stretched out straight).

1. there are thousands of finger-like protrusions, called villi, which maximize the absorption of nutrients.

2. mucous cells line the small intestine to protect against infection and to provide moisture to digesting food.

3. bile, a substance produced in the liver and stored in the gall bladder, is released into the small intestine to digest fat.

4. pancreatic enzymes are released into the small intestine to digest carbohydrates.

5. Functions of the small intestine include:

a. to add more water, chemicals, and enzymes which breaks food into smaller and smaller particles. This slowly breaks down the chemical bonds that hold food together.

b. to absorb primary nutrients (protein, carbohydrate, and fat).

(1) the cells of the body send messages, either via nerves or through the blood stream, to the brain when it needs more of a particular nutrient.

(2) the brain sends messages to the intestines to absorb more of the specific substance .

[NOTE: The brain can also create cravings for foods containing the needed nutrient.]

(3) if the nutrient is available, as in a balanced diet, and the small intestine is working at its potential, all of the body's nutritional needs are met by the absorption that takes place in the small intestine.

C. The large intestine is a larger, more muscular tube which is wider than the small intestine (about 1.5 inches in diameter when empty) and shorter in length (about 16-20 inches).

1. the walls are smoother, and there are fewer villi

2. Functions of the large intestine include:

a. to re-absorb water added to digesting food.

b. to absorb vitamins and minerals.

c. to secrete mucous which lubricates the movement of thicker waste materials (stool).

d. to store waste and eliminate it from the body.

D. Accessory Organs:

1. Liver:

a. a large organ that filters toxins out of the blood and breaks down old blood cells.

b. it makes bile, which converts fat into a water soluble substance.

2. Gall Bladder:

a. stores bile, and squeezes it out into the small intestine according to the quantity of fat detected by the stomach.

b. the gall bladder does not produce anything.

3. Pancreas:

a. secretes the enzymes needed to break down carbohydrates, some proteins, and fats.

b. delivers these enzymes in a large quantity of water which is used to liquefy the digesting food, allowing it to be more easily broken down and absorbed.

II. Direct Affects of HIV on the Digestive System

A. HIV infects the mucous cells that line the intestines, causing a change in the quantity and quality of mucous production. This disrupts the balance of the digestive process.

B. The immune response to pathogens that come through the digestive system is reduced. This allows opportunistic infections to occur.

C. Infection in the small intestine causes swelling of the tissues. This inflammation reduces the absorption of nutrients, even when they are available. This is called "malabsorption".

III. Indirect Affects of HIV Infection on this System

A. Slowed electrical and chemical messages from the brain change digestion

B. A reduction of oxygen in the bloodstream disrupts effective functioning

C. Slowed drainage of damaged cells and the toxins through the lymphatic system causes back pressure in the GI system

IV. HIV Related Eating Problems That Affect Nutrition
(See chart for helpful hints in dealing with these problems.)

A. Loss of appetite

B. Nausea

C. Vomiting

D. Diarrhea

E. Feeling full quickly

F. Difficulty of painful swallowing

G. Difficult of painful chewing

H. Taste changes

I. Shortness of Breath

J. Dementia

K. Strict dietary restrictions

L. Inadequate funds for food

M. Too tired to prepare food

V. Common OIs of This System (See chart for more details)

A. *Mycobacterium avium* complex (MAC) or *Mycobacterium* intracellular (MAI) (#5 OI), used interchangeably

B. Wasting syndrome **(#10 OI)**

C. Cryptosporidosis **(#12 OI)**

D. Salmonella septicemia

E. Isisporiosis

VI. Common Symptoms of Digestive System Disorders

A. Dehydration

B. Acute diarrhea: a sudden onset of watery stool lasting over 12 hours

C. Chronic diarrhea: watery stools that come and go

D. Loss of appetite

E. Enlarged liver

VII. Constitutional symptoms:

A. Fever

B. Abdominal pain

C. Lethargy

D. Night sweat

E. Nausea and vomiting

F. Weight loss

G. Chills

HANDOUTS
Chart: HIV Disorders of the GI System

EVALUATION
Student quiz

SUPPLEMENTAL ACTIVITIES
Reading, No Time to Wait: None

Handouts/Skills/ Materials:

Not included

- Basic assessment of GI system (based on lesson plan)
- Care of: Feeding tubes (adult, child, & infant sizes)
- Use of: Feeding pump
- Feeding tube insertion and care
- How to take blood pressure and pulse
- Basic assessment of respiratory effort and capacity
- Establish "baseline orientation"
- Identify comparative signature affected by neurological changes
- Identify dehydration using the skin

Included:

- Identify constitutional symptoms and discuss appropriate actions
- Discuss stress management techniques with clients (Appendix D)
- Assessing neurological status (based on handout)

Chart of HIV Disorders of the GI System

Common HIV disorders	Cause	Symptoms/Diagnosis	Comments/Treatment
Cryptosporidiosis, chronic intestinal # 12 OI	Parasite.	Severe diarrhea with frequent watery stools, abdominal cramping, nausea, vomiting, flatulence, weight loss, loss of appetite, constipation, dehydration, electrolyte imbalances, malaise, fever. Dx: stool tests, biopsy	It is possible to be infected but be asymptomatic. Tx: diclazuril, arithromycin, somatostatin, paromomyisin (Humatin)
Isosporiasis, chronic intestinal	Protozoan From eating under-cooked beef or pork. Can be sexually transmitted.	Watery diarrhea (non-inflammatory), abdominal pain and cramps, vomiting, anorexia, weight loss, fever, weakness. Indistinguishable from symptoms of cryptosporidiosis. Dx: stool tests	Most commonly found in tropical and subtropical climates. Tx: anti-protozoan drugs
Mycobacterium avium complex (MAC), Mycobacterium intracellular (MAI) # 5 OI	A mycobacterium found in soil, water, animals, eggs, unpasteurized dairy products, and other food. Non-communicable.	Persistent fever, weakness, night sweats, anorexia, weight loss, dizziness, nausea, abdominal pain, diarrhea, flu-like symptoms, shortness of breath, possible cough. Enlarged lymph nodes, frequently on one side, enlarged liver and spleen, soft tissue masses (particularly in thighs). Presumptive Dx: high fever, wt. loss, diarrhea, T4 <70 Definitive Dx.: stool culture (treat until culture returns)	Can involve almost any organ system, but contamination is usually through the lungs or gastrointestinal tract. This condition may begin as a lung infection and then move to other organs, including the blood and bone marrow. Usually affects people with T4 cells below 70. This is a common underlying OI for which prophylaxis is important. The terms MAC and MAI are used interchangeably. Tx: azithromycin, clarithromycin, ciprofloxacin, clofazimine, amikacin, Rifabutin, rifampin, ethambutol

Chart of HIV Disorders of the GI System

Common HIV disorders	Cause	Symptoms/ Diagnosis	Comments/ Treatment
Salmonella septicemia, recurrent (Salmonellosis)	Bacteria. From ingestion of contaminated food and water.	Fever, chills, sweats, weight loss, diarrhea, anorexia. Definitive Dx: culture both blood and stool	Although enterocolitis is common in people with AIDS, it is not usually caused by *salmonella*. Tx: ceftiaxone, ampicillin, amoxicillin
Wasting syndrome **# 10 OI**	Usually due to poor absorption.	Profound involuntary weight loss, inability to absorb nutrients, chronic diarrhea, fever, weakness Presumptive Dx.: wt loss <10% of baseline wt + chronic diarrhea and in the absence of other medical explanation	This diagnosis is given when other types of infection that could cause weight loss have been ruled out. Chronic weight loss can have other primary causes: malnourishment, changes in metabolism, the inability to absorb nutrients, diarrhea, and reduced food intake. The latter, in turn, can result from lack of appetite, oral ulceration's and lesions, and drug side affects. Tx: Megace, Marinol, total parenteral nutrition (TPN), Trental

THE DIGESTIVE SYSTEM AND HIV

Name: _____ Date: _____

PART I - True or False

Directions: Read each statement carefully. In the space provided, write the word "True" if the statement is true, or write the word "False" if the statement is false

_____ 1. The stomach adds water to food to help in the digestion process.

_____ 2. The small intestines contain thousands of finger like projections called villi.

_____ 3. The large intestine is much longer than the small intestine.

_____ 4. HIV directly affects the digestive system by interfering with the normal immune response to pathogens.

PART II - Short Answer

Directions: Read each item carefully. In the space provided, write a brief answer that addresses all aspects of the question.

5. Briefly define the following key terms from this lesson:

a) liver _____

b) malabsorption _____

6. List 5 HIV-related eating problems that can affect nutrition:

a) _____

b) _____

c) _____

d) _____

e) _____

7. List a major symptom of symptoms for the following digestive system OIs

a) Wasting syndrome _____

b) Cryptosporidosis _____

c) avium complex _____

8. List 4 constitutional symptoms that may be indicative of digestive system disorders

a) _____

b) _____

c) _____

d) _____

THE DIGESTIVE SYSTEM AND HIV

WHY STUDY THE DIGESTIVE SYSTEM?:

HIV's affects on the digestive system can range from bothersome to debilitating. Many PWAs will experience eating problems resulting from or bringing about digestive system complications. Service care providers who possess thorough information of the structure, function, and affects of HIV on the digestive system will be better able to spot symptoms, identify problems and offer solutions that may bring relief from these problems to HIV infected individuals.

OBJECTIVES:

At the completion of this lesson, students will:

1. know the definitions of the lesson's key terms, so that they can correctly identify and/or define those terms presented on the chapter quiz.

2. correctly list and be able to briefly describe the 3 main organs and 3 accessory organs that make up the digestive system.

3. correctly differentiate between the functions of the stomach, small intestine, and large intestine by writing a 1 sentence summary of the function of each of these 3 organs.

4. correctly differentiate between the functions of the liver, gall bladder, and pancreas, by accurately listing the functions of these 3 accessory organs.

5. accurately identify the direct affects of HIV on the digestive system as infecting mucous cells, reducing immune response to pathogens, and malabsorption.

6. correctly list 6 of the 13 HIV-related eating problems that affect nutrition as presented in the lecture.

7. correctly identify the major symptoms of OIs associated with this system, as listed on Appendix G.

8. correctly list and/or identity at least 3 common symptoms of digestive system disorders as presented in the lecture.

9. correctly list and/or identify at least 4 constitutional symptoms that may signal digestive system disorders as presented in the lecture.

KEY TERMS:

bile	gall bladder	large intestine
liver	malabsorption	pancreas
small intestine	stomach	villi

LESSON CONTENT (SUMMARY):

Introduction:

In all of the prior lessons, the role of water and nutrients in relation to the health and repair of cells has been emphasized. It is the digestive system which is primarily responsible for ensuring these vital elements are available for the cells. This is accomplished through a complex set of events that occur at different locations along the digestive track.

The digestive system consists of the stomach, small intestine, large intestine, and three accessory organs: the liver, gall bladder, and pancreas.

The entire digestive system is heavily lined with mucous cells. These cells typically have on them a protein called gp-120 that HIV is attracted to. This is the major reason why the digestive system is so vulnerable to HIV.

Another significant factor is that the lining of the small intestine is filled with blood capillaries which facilitate the absorption of nutrients. As the intestines commonly contain numerous organisms, the immune system also keeps a large number of macrophages, T cells, B cells, and lymph nodes on hand. All of these general host participants also contain gp120 proteins and are frequently infected in HIV+ individuals when they come to the walls of the intestines. As micro-organisms get through the intestinal wall, the immune cells are weakened in number and ability by HIV. This allows pathogens entry into the body, in a way the body thought it had protected.

Content Outline:

I. Structure and Function of Digestive System

A. The stomach is simply an expandable sac

B. The small intestines are over 20 feet of long, thin walled, tubing (if stretched out straight)

C. The large intestine is a larger, more muscular tube which is wider than the small intestine (about 1.5 inches in diameter when empty) and shorter in length (about 16-20 inches)

D. Accessory Organs

1. Liver

2. Gall Bladder

3. Pancreas

II. Direct Affects of HIV on the Digestive System

A. HIV infects the mucous cells that line the intestines.

B. The immune response to pathogens that come through the digestive system is reduced.

C. Infection in the small intestine causes swelling of the tissues.

III. Indirect Affects of HIV Infection on this System

IV. HIV Related Eating Problems That Affect Nutrition

V. Common OIs

A. *Mycobacterium avium* complex (MAC) or *Mycobacterium* intracellular (MAI) (#5 OI), used interchangeably

B. Wasting syndrome **(#10 OI)**

C. Cryptosporidosis **(#12 OI)**

D. Salmonella septicemia

E. Isisporiosis

VI. Common Symptoms of Digestive System Disorders

Constitutional Symptoms

The medical training makes me feel more secure of myself in terms of the work I do. Also, it taught me that it is never too late to learn new things in life.

Nerida Alvarez
Case Manager Assistant
ActionAIDS

NUTRITION AND HIV

RATIONALE:

Good nutrition is essential to good health. HIV infected individuals must take special care to ensure their diet provides all the nutrients needed to sustain good health. As discussed in the digestive system lesson, there are many reasons why PWAs have problems eating. It is because of these many eating problems, accompanied with the increased need for food, that understanding nutrition is important when dealing with HIV. Service care providers who are knowledgeable about good nutrition, and who can develop strategies to help HIV infected individuals eat well, maintain adequate levels of nutrients, and deal with problems that may develop around nutrition, can help improve the quality of life of those they serve.

GOALS:

1. Students will learn the elements of basic nutrition and their functions.

2. Students will learn the four basic food groups and their contributions to good nutrition.

3. Students will learn the nutritional requirements necessary for PWAs to sustain good health.

4. Students will learn strategies to help PWAs deal with eating problems.

OBJECTIVES:

At the completion of this lesson, students will:

1. know the definitions of the lesson's key terms, so that they can correctly identify and/or define those terms presented on the chapter quiz.

2. given the names of the 4 basic food groups, correctly identify what nutritional benefit is contributed by each.

3. given the name of any of the 4 basic food groups, identify an example of what 1 serving of this food group would consist of.

4. accurately list 4 suggestions provided in the lecture that can help PWAs increase the nutritional value of the food they eat.

5. for each problem listed on the "Solutions to Nutritional Problems Common to AIDS" handout, correctly identify 1 eating tip and 1 suggested food that may help to alleviate the problem.

MATERIALS NEEDED:

General supplies needed include:

- chalk board, dry erase board, or newsprint pads
- markers
- masking tape
- pens and pencils
- paper for taking notes (if students do not have notebooks)

Lesson plan
Student guide
Lesson quiz
Appendix I: Solutions to Nutritional Problems Common to AIDS

KEY TERMS:

protein	fat	carbohydrate
vitamin	mineral	

PROCESS:

Introduction

"You are what you eat." Most of us have heard this expression at some point in our lives, usually from someone who cares about our health and well-being. The expression is absolutely true.

As we have seen in our study of the body's systems, the availability of water and nutrients has been mentioned over and over. Health maintenance and recovery from illness are dependent upon these elements. It is impossible to be healthy and eat poorly.

There are about 50 different nutrients, each with a different purpose and each needed in different quantities. This delicate balance is required for the body to function at its' full potential.

Lecture:

Nutrients

Protein is the building blocks of all muscle and organ cells (e.g., lungs, liver, and heart)

Fat and carbohydrate are broken down into energy used by the cell to do its work

Vitamins and minerals assist energy from digested food in getting into the cells for use

[NOTE: vitamins and minerals are not a sources of energy themselves.]

Basic Food Groups

Grain Products: the energy source that is most easily digested.

Vegetables and fruits: provide little energy but have lots of vitamins and minerals.

[NOTE: choose dark green and orange colored food for best nutritional value]

Milk products: a good source of protein and energy.

[NOTE: PWAs should select higher fat products to get the most possible energy from the least amount of food.]

Meat and meat alternative foods: an excellent source of protein.

[NOTE: do not cut fat off of meats before cooking, eating meats heavier in fat will increase energy potential of the food.]

Nutritional Requirements and HIV

It has been suggested by many nutritionists that HIV infected individuals may require five times the normal daily minimum requirement of nutrients. (See following chart.)

Daily Serving Requirements For Different Stages Of HIV Infection

	Asymptomatic	**Symptomatic**	**Weight Gain**	
Food Group	*# of Servings*	*# of Servings*	*# of Servings*	*One Serving*
Grains	5	6	6	1 slice bread 3/4 cup cereal 1/2 bagel , bun 1/2 cup rice 1/2 cup pasta
Vegetables & Fruit	5	5	5	1 average fresh 1/2 cup canned 1/2 cup frozen 1/2 cup fresh 1/2 cup juice 1 cup salad
Milk Products	2	3	4	1 cup milk 3/4 cup yogurt 2 slices cheese
Meat & Alternatives	3	4	4	1 egg 1/2 cup cooked legumes 1/3 cup tofu 2 tbs. peanut butter

Suggestions for Increasing Nutrition (also see chart for further details)

If weight gain is desirable or eating problems make it hard to get all of the required serving, try the following:

1. add brown sugar to morning cereal
2. blend ice cream into morning juice
3. be generous when using butter or margarine on bread or muffins
4. eat cream soups
5. add lots of butter to potatoes and rice
6. add lots of mayonnaise to your sandwiches
7. add ice cream to apple sauce or other fruit
8. add cream to fruit

[NOTE: When HIV infected individuals are ill, they usually do not feel like eating. The real problem comes when the increased demand for nutrients, due to an active immune response, and reduced intake of nutrients, from not eating or reduced food intake, lasts for weeks or months at a time. Severe loss of weight and muscle mass is the result. In 5-10% of HIV+ individuals, uncontrolled weight loss can occur even without an acute infection, this process is called wasting syndrome (See OI chart).]

HANDOUTS:
Appendix I: Solutions to Nutritional Problems Common to AIDS

EVALUATION:
Student quiz

SUPPLEMENTAL ACTIVITIES

Reading. No Time to Wait: Chapter 15

Handouts/Skills/ Materials:

Not Included

- Appropriate meal planning
- Identify constitutional symptoms and discuss appropriate actions
- Establish "baseline orientation"
- Identify comparative signature affected by neurological changes
- Identify dehydration using the skin
- Basic assessment of GI system (based on lesson plan)
- Use of: Feeding tubes (adult, child, & infant sizes)
- Use of: Feeding pump

Included:

- Discuss stress management techniques with clients (Appendix D)

NUTRITION AND HIV

Name: _____ Date: _____

PART I - True or False

Directions: Read each statement carefully. In the space provided, write the word "True" if the statement is true, or write the word "False" if the statement is false

_____ 1. Grains are the energy source that are most easily digested.

_____ 2. Milk products are not a good source of protein.

_____ 3. HIV infected individuals need less of the daily requirements of nutrients because they are usually less active than HIV negative people.

_____ 4. HIV infected individuals experiencing diarrhea should be encouraged to skip meals.

PART II - Short Answer

Directions: Read each item carefully. In the space provided, write a brief answer that addresses all aspects of the question.

5. Briefly define the following key terms from this lesson:

a) protein _____

b) fat _____

c) vitamin _____

6. In the lecture, suggestions that can help PWAs increase the nutritional value of the foods they eat were provided. List any 4 of these:

a) _____

b) _____

c) _____

d) _____

NUTRITION AND HIV

WHY STUDY NUTRITION?:

Good nutrition is essential to good health. HIV infected individuals must take special care to ensure their diet provides all the nutrients needed to sustain good health. However, as discussed in the digestive system lesson, there are many reasons why PWAs have problems eating. It is because of these many eating problems, accompanied with the increased need for food, that understanding nutrition is important when dealing with HIV. Service care providers who are knowledgeable about good nutrition, and who can develop strategies to help HIV infected individuals eat well, maintain adequate levels of nutrients, and deal with problems that may develop around nutrition, can help improve the quality of life of those they serve.

LESSON OBJECTIVES:

At the completion of this lesson, students will:

1. know the definitions of the lesson's key terms, so that they can correctly identify and/or define those terms presented on the chapter quiz.

2. given the names of the 4 basic food groups, correctly identify what nutritional benefit is contributed by each.

3. given the name of any of the 4 basic food groups, identify an example of what 1 serving of this food group would consist of.

4. accurately list 4 suggestions provided in the lecture that can help PWAs increase the nutritional value of the food they eat.

5. for each problem listed on the "Solutions to Nutritional Problems Common to AIDS" handout, correctly identify 1 eating tip and 1 suggested food that may help to alleviate the problem.

KEY TERMS:

protein	fat	carbohydrate
vitamin	mineral	

LESSON CONTENT (SUMMARY):

Introduction

"You are what you eat." Most of us have heard this expression at some point in our lives, usually from someone who cares about our health and well-being. The expression is absolutely true.

As we have seen in our study of the body's systems, the availability of water and nutrients has been mentioned over and over. Health maintenance and recovery from illness are dependent upon these elements. It is impossible to be healthy and eat poorly.

There are about 50 different nutrients, each with a different purpose and each needed in different quantities. This delicate balance is required for the body to function at its' full potential.

Content Outline:

I. Nutrients

- A. Protein
- B. Fat and carbohydrate
- C. Vitamins and minerals

II. Basic Food Groups

- A. Grain products
- B. Vegetables and fruits
- C. Milk products
- D. Meat and meat alternative foods

III. Nutritional Requirements and HIV

It has been suggested by many nutritionists that HIV infected individuals may require five times the normal daily minimum requirement of nutrients.

Daily Serving Requirements For Different Stages Of HIV Infection

	Asymptomatic	**Symptomatic**	**Weight Gain**	
Food Group	*# of Servings*	*# of Servings*	*# of Servings*	*One Serving*
Grains	5	6	6	1 slice bread 3/4 cup cereal 1/2 bagel , bun 1/2 cup rice 1/2 cup pasta
Vegetables & Fruit	5	5	5	1 average fresh 1/2 cup canned 1/2 cup frozen 1/2 cup fresh 1/2 cup juice 1 cup salad
Milk Products	2	3	4	1 cup milk 3/4 cup yogurt 2 slices cheese
Meat & Alternatives	3	4	4	1 egg 1/2 cup cooked legumes 1/3 cup tofu 2 tbs. peanut butter

IV. Suggestions for Increasing Nutrition (also see chart for further details)

Medical training has contributed to my job by giving me knowledge to deal with situations involving client care. It has also helped me in explaining to my clients the importance of taking their meds and keeping their doctor appointments.

Nerida Alvarez
Case Manager Assistant
ActionAIDS

THE SPECIAL CONCERNS OF WOMEN AND HIV

RATIONALE:

Women living with HIV face a host of infections, diseases, and complications that HIV infected men do not. Service care providers must understand the unique needs of HIV positive women if they intend to provide high quality care to these individuals. Understanding how HIV infection manifests differently in women, knowing the unique signs and symptoms HIV positive women exhibit, and being aware of the special preventative and diagnostic tests HIV infected women should receive will help service care providers ensure that these women get what they need to maintain good health.

GOAL:

Students will learn the unique situations, symptoms, disorders, and diagnostic tests related to HIV infected women.

OBJECTIVES:

At the completion of this lesson, students will:

1. know the definitions of the lesson's key terms, so that they can correctly identify and/or define those terms presented on the chapter quiz.

2. correctly list the important differences in manifestation of HIV infection in women as listed in the lesson.

3. accurately list any 4 of the 6 early gynecological signs and symptoms specific to HIV+ women listed in the lesson.

4. accurately list any 4 of the 6 common gynecological HIV-related disorders for women listed in the lesson.

5. correctly identify the major symptoms of OIs associated with this system, as listed on Appendix G.

6. accurately list the 4 diagnostic and preventive practices for HIV+ women as listed in the lesson.

MATERIALS NEEDED:

General supplies needed include:

- chalk board, dry erase board, or newsprint pads
- markers
- masking tape
- pens and pencils
- paper for taking notes (if students do not have notebooks)

Lesson plan
Student guide
Lesson quiz

KEY TERMS:

ectopic pregnancy	gynecological	vagina
cervix	PAP smear	

PROCESS:

Introduction

There are two main themes connected to the special concerns of HIV+ women. The first is that there are significant differences in the way HIV infection manifests in women. These differences went unrecognized for the first ten years of the epidemic. Secondly, women get all of the same HIV-related infections men get.

In the early HIV epidemic, many women died of HIV-related disorders but were never identified as HIV infected until autopsy. This was primarily because HIV frequently begins to manifest itself in women through gynecological disorders. These disorders were primarily being handled by gynecologists who typically had very little knowledge of (and even less experience with) HIV/AIDS. During this time, AIDS was thought of as a "gay male STD", not anything gynecologists needed to be concerned with.

As more women worldwide (almost 50% in many countries) became HIV infected, and more research was done on these women, the unique qualities of HIV infection in women began to be more widely presented to the health care community. More STD-related conditions were identified as possibly HIV-related, and more HIV testing of women began.

As still more HIV+ women were identified, it became clear that many of the "mysterious" respiratory conditions affecting, and sometimes killing, women were the same as those affecting and killing HIV+ men.

Much progress has been made in the 1990's to deal with the special issues facing HIV infected women.

Lecture:

I. Social/Cultural Issues that Complicate HIV-related Matters for Women

A. Prevention behaviors for women are sometimes made difficult by:

1. cultural standards (e.g., men decide if a condom will be used)

2. gender standards (e.g., women are expected to be monogamous, men are not)

3. economic standards (e.g., sex workers are most commonly women and feel powerless to demand condom use by clientele)

B. Although recognition, treatment, and research of HIV-related disorders in women is improving, the number of women progressing to an AIDS diagnosis is climbing at an alarming rate in the US. Much more focus in this area is needed.

II. Some Important Differences in Manifestation of HIV Infection in Women

A. Gynecological disorders significantly increase in frequency and severity.

B. As a result of their physical design, HIV infected women have more frequent STDs and more complications from STDs than HIV infected men do.

C. It is speculated that pregnancy can accelerate HIV progression.

III. Early Gynecological Signs and Symptoms Specific to HIV Infected Women

A. Infections are often symptom free

B. Vaginal discharge, with or without: odor, color, texture

C. Pain during intercourse

D. Miscarriage, or ectopic (tubal) pregnancy, or infertility

E. Painful urination

F. Vaginal itching and/or burning and/or redness

IV. Common Gynecological HIV-Related Disorders for Women

A. Chronic vaginal infections

B. Chronic pelvic infections

C. Chronic pelvic pain

D. Menstrual changes

E. Abnormal PAP smears

F. Cervical Cancer

V. Common OIs

A. All of the same OIs discussed in prior lessons

B. OIs specific to women (see OI chart for more detail)

1. Chlamydia

2. Vaginal thrush (chronic vaginitis)

3. Herpes (genital)

4. Penicillin-resistant gonorrhea

5. Syphilis

6. Vaginal warts

VI. Diagnostic and Preventive Practices

A. GYN and PAP smear every 6 months (every 3 months when T cell <200)

B. Vaginal cultures (for bacterial and viral STDs)

C. Blood test for syphilis (sometimes a spinal tap is needed)

D. Anal culture if warts are involved

HANDOUTS
None

EVALUATION
Student quiz

SUPPLEMENTAL ACTIVITIES
Reading. No Time to Wait: Chapter 11
Table 4-2

Handouts/Skills/ Materials:

None

Review:

Identify constitutional symptoms and discuss appropriate actions
Discuss stress management techniques with clients (Appendix D)
Establish "baseline orientation"
Identify comparative signature affected by neurological changes
Identify dehydration using the skin
Basic assessment of GI system (based on lesson plan)
Use of: Feeding tubes (adult. child. & infant sizes)
Use of: Feeding pump
Appropriate meal planning

THE SPECIAL CONCERNS OF WOMEN AND HIV

Name: _____ Date: _____

PART I - True or False

Directions: Read each statement carefully. In the space provided, write the word "True" if the statement is true, or write the word "False" if the statement is false

_____ 1. Cultural, gender, and economic standards often make it easier for women to adopt preventative behaviors that help reduce the risk of HIV infection.

_____ 2. HIV infected men get far more STDs and far more serious STDs than HIV infected women.

_____ 3. A common HIV-related disorder for women can be menstrual changes.

_____ 4. Women are not susceptible to many of the OIs that HIV infected men get.

PART II - Short Answer

Directions: Read each item carefully. In the space provided, write a brief answer that addresses all aspects of the question.

5. Briefly define the following key terms from this lesson:

a) PAP smear _____

b) ectopic pregnancy _____

6. List any 4 of the 6 early gynecological signs and symptoms specific to HIV+ women that we discussed in this lesson

a) _____

b) _____

c) _____

d) _____

7. List the 4 diagnostic and preventive practices for HIV+ women discussed in this lesson

a) _____

b) _____

c) _____

d) _____

THE SPECIAL CONCERNS OF WOMEN AND HIV

WHY STUDY WOMEN AND HIV?:

Women living with HIV face a host of infections, diseases, and complications that HIV infected men do not. Service care providers must understand the unique needs of HIV positive women if they intend to provide high quality care to these individuals. Understanding how HIV infection manifests differently in women, knowing the unique signs and symptoms HIV positive women exhibit, and being aware of the special preventative and diagnostic tests HIV infected women should receive will help service care providers ensure that these women get what they need to maintain good health.

LESSON OBJECTIVES:

At the completion of this lesson, students will:

1. know the definitions of the lesson's key terms, so that they can correctly identify and/or define those terms presented on the chapter quiz.

2. correctly list the important differences in manifestation of HIV infection in women as listed in the lesson.

3. accurately list any 4 of the 6 early gynecological signs and symptoms specific to HIV+ women listed in the lesson.

4. accurately list any 4 of the 6 common gynecological HIV-related disorders for women listed in the lesson.

5. correctly identify the major symptoms of OIs associated with this system, as listed on Appendix G.

6. accurately list the 4 diagnostic and preventive practices for HIV+ women as listed in the lesson.

KEY TERMS:

ectopic pregnancy	gynecological	vagina
cervix	PAP smear	

LESSON CONTENT (SUMMARY):

Introduction

There are two main themes connected to the special concerns of HIV+ women. The first is that there are significant differences in the way HIV infection manifests in women. These differences went unrecognized for the first ten years of the epidemic. Second, in addition to these different manifestations, women get all of the same HIV-related infections men get.

In the early HIV epidemic, many women died of HIV-related disorders but were never identified as HIV infected until autopsy. This was primarily because HIV frequently begins to manifest itself in women through gynecological disorders. These disorders were primarily being handled by gynecologists who typically had very little knowledge of (and even less experience with) HIV/AIDS. During this time, AIDS was thought of as a "gay male STD", not anything gynecologists needed to be concerned with.

As more women worldwide (almost 50% in many countries) became HIV infected, and more research was done on these women, the unique qualities of HIV infection in women began to be more widely presented to the health care community. More STD-related conditions were identified as possibly HIV-related, and more HIV testing of women began.

As still more HIV+ women were identified, it became clear that many of the "mysterious" respiratory conditions affecting, and sometimes killing, women were the same as those affecting and killing HIV+ men.

Much progress has been made in the 1990's to deal with the special issues facing HIV infected women.

Content Outline:

I. Social/Cultural Issues that Complicate HIV-related Matters for Women

A. Prevention behaviors for women are sometimes difficult

B. Although recognition, treatment, and research of HIV-related disorders in women is improving, the number of women progressing to an AIDS diagnosis is climbing at an alarming rate in the U.S. Much more focus in this area is needed.

II. Some Important Differences in Manifestation of HIV Infection in Women

III. Early Gynecological Signs and Symptoms Specific to HIV Infected Women

IV. Common Gynecological HIV-Related Disorders for Women

V. Common OIs

A. All of the same OIs discussed in prior lessons

B. OIs specific to women

1. Chlamydia

2. Vaginal thrush (chronic vaginitis)

3. Herpes (genital)

4. Penicillin-resistant gonorrhea

5. Syphilis

6. Vaginal warts

VI. Diagnostic and Preventive Practices

I feel the training was beneficial; it enhanced the knowledge that I knew, and put to death the ignorance of several things. It has made me more confident; I can now do my job efficiently without fear of the unknown.

Waverly Gantt
Case Manager Assistant
ActionAIDS

INFANTS, CHILDREN, and HIV

RATIONALE:

The experience of HIV infected infants and children is vastly different from that of HIV infected adults. Information about transmission, treatment options, symptoms, and long-term affects of HIV infection as they relate to infants and children must be understood if service care providers hope to adequately meet the special needs of this population.

GOAL:

Students will learn the unique issues pertaining to transmission, testing, and disease progression of HIV infected infants and children.

OBJECTIVES:

At the completion of this lesson, students will:

1. know the definitions of the lesson's key terms, so that they can correctly identify and/or define those terms presented on the chapter quiz.

2. correctly identify that the use of AZT during pregnancy can dramatically reduce the incidence of HIV transmission from mother to child.

3. correctly list the 4 methods by which infants and children become HIV infected.

4. accurately list any 4 of the 7 factors that can influence HIV transmission discussed in the lesson.

5. correctly identify the major symptoms of OIs associated with this system, as listed on Appendix G .

6. correctly identify 4 of the 7 developmental issues seen in children who are long-term survivors of HIV infection.

MATERIALS NEEDED:

General supplies needed include:

- chalk board, dry erase board, or newsprint pads
- markers
- masking tape
- pens and pencils
- paper for taking notes (if students do not have notebooks)

Lesson plan
Student guide
Lesson quiz

KEY TERMS:

Attention Deficit Disorder (ADD)	cesarean section	vaginal birth
placenta	Polymerase Chain Reaction (PCR)	
Western Blot	ELISA	

PROCESS:

Introduction:

As more and more women became HIV infected, the incidence of infected infants has climbed as well. Just as research has often not included women, it has also not included infants and children. In the early days of the epidemic, HIV testing of newborns was done only if it was already known that the mother was infected. Most infants tested positive, but did not get sick. Health care professionals were confused when at about 12-18 months, many of these infants no longer tested positive and never tested positive again or demonstrated any signs of infection.

Many infants and children died of infections, usually respiratory, commonly seen in AIDS without ever being tested for HIV. Most pediatricians who saw these cases thought that AIDS was only a "gay men's" disease. HIV infection was not considered in diagnostic work ups on these children. Even after infants and children were diagnosed with HIV, pediatricians worked without treatment standards for many years.

Fortunately today, there are treatment standards and pediatric specialists that treat HIV infected infants and children. As a result, life expectancy is continually improving for these infants and children.

Unfortunately, the incidence of infection among infants and children is climbing every year. Preventing HIV infection is the key. Research has shown the infection rate can be reduced from 35% to 8.5% when:

a) the mother's HIV status is known
b) an HIV infected mother follows medical standards of treatment during pregnancy
c) follow-up treatment standards for infants are followed, lasting at least two years.

Developmental delays, both physical and cognitive, are commonly seen in HIV infected children. It is thought, and research needs to support, that children have a lower rate of long term survival than adults. It is also thought that this is due to compromise experienced in normal growth and development.

Lecture:

I. Transmission

A. The rate of HIV infection from mother to infant drops from 35% to 8.5% with the use of AZT during the last stage of pregnancy.

B. This infection rate could drop further if AZT is used earlier in pregnancy or with combination therapy.

C. Of infected infants, 65% are infected at birth compared to 35% infected during pregnancy.

D. Modes of transmission for infants and children are:

1. through the placenta prior to birth.

a) HIV passes along with macrophages and B cells

b) normally these cells are intended to provide the infant with some immunity for a short time after birth (until the baby's own immune system is fully functioning)

2. through the ingestion of maternal blood during delivery.

3. though the breast milk of an infected mother.

4. through blood transfusions received at birth or after birth.

E. Factors that can influence HIV transmission:

1. age of the mother, women under 18 and over 40 have a higher rate of transmission.

2. various maternal co-infections (e.g., CMV or STDs).

3. the type conditions of delivery.

a) for vaginal births, a strong antiviral wash of the vagina is needed prior to cervical dilation

b) cesarean sections are preferred when attempting to prevent HIV transmission, but these bring higher risks of maternal infection and activating the mother's HIV

c) all infants must have maternal blood cleaned from their mouth, nose, and stomach within minutes after birth

4. the presence or absence of anti-HIV drugs.

5. the mother's nutritional status.

6. the mother's viral load, the higher the maternal viral load, the higher the incidence of transmission particularly prior to birth.

7. the mother's T-cell count.

a) a count of less than 200 carries a 45% chance of transmitting the virus

b) a count of above 500 carries a 16% chance of transmission

II. Testing Issues for Infants and Children

A. HIV antibody testing (ELISA and Western Blot)

1. identifies the presence of HIV antibodies.

2. positive results for antibodies can be from the mother or the infant.

3. many hospitals test all infants at birth.

[NOTE: this is still a very controversial practice]

a) these test results currently go anonymously to the CDC to track the trends of the infection.

b) this happens without the mother's consent, so neither she nor her health care professionals know the results of the test.

4. testing of all biological children is strongly encouraged when an HIV infected parent is identified, but only with the parent's consent.

5. there must be repeated testing for HIV infected infants under 18 months of age, because it can take this long for the mothers HIV antibodies to leave the infants system.

B. Polymerase Chain Reaction (PCR)

1. identifies HIV genes.

2. positive results are specific to the infant or child.

3. for infants infected at birth, a PCR will show positive results after 30 days.

4. infants infected during pregnancy may be PCR positive at birth.

5. the American Academy of Pediatrics recommends multiple testing, at birth and repeated at 30 days.

6. PCR tests are still very expensive, but research is being done to improve and lessen the expense of testing.

III. Pediatric Progression of HIV

A. In a six year study of 248 HIV+ children:

1. 15-20% of infants progressed to AIDS, experienced OIs in the first year of life, and died before the age of 3 or 4.

a) most of these infants were born to mothers with high viral loads and low t-cell counts.

b) the conclusion drawn is, these infants were infected prior to birth.

2. 80-85% remained asymptomatic for many years, neurological manifestations occurred less frequently and much later in life.

3. 70% of HIV+ children were still alive at age six, and one third of these children remain asymptomatic at six years of age.

IV. Common OIs (See OI chart for more details)

A. Due to the incomplete development of infant's lungs at birth. the most significant and life threatening OIs clearly involve respiratory infections.

1. bacterial pneumonia

2. viral pneumonia

3. PCP

a) highest incidence is 3-8 months of age

b) 30% mortality

B. Other common OIs

1. Encephalopathy

2. Failure to thrive/wasting syndrome

3. Lymphocytic interstitial pneumonitis or pulmonary lymphoid hyperplasia

4. Meningitis and/or septicemia

5. HIV associated malignancy (commonly Pulmonary Lymphoma's)

6. Thrombocytopenia

V. Developmental Issues In Long-Term Survivors (over 6 years)

A. Short in statue and commonly below average weight

B. Learning disabilities

C. Attention deficit disorder (ADD)

D. Delayed speech

E. Loss of motor and neurological skills previously mastered

F. Visual and hearing deficit

G. Poor school attendance due to frequency of Os. the need for frequent medical appointments, and hospitalizations

HANDOUTS
None

EVALUATION
Student quiz

SUPPLEMENTAL ACTIVITIES
Reading, No Time to Wait: None

Handouts/Skills/ Materials:

Review:

Identify constitutional symptoms and discuss appropriate actions
Discuss stress management techniques with clients (Appendix D)
Establish "baseline orientation"
Identify comparative signature affected by neurological changes
Identify dehydration using the skin
Basic assessment of GI system (based on lesson plan)
Use of: Feeding tubes (adult, child, & infant sizes)
Use of: Feeding pump
Appropriate meal planning

INFANTS, CHILDREN, AND HIV

Name: _____ Date: _____

PART I - True or False

Directions: Read each statement carefully. In the space provided, write the word "True" if the statement is true, or write the word "False" if the statement is false

_____ 1. Younger women and older women have less chance of transmitting HIV to their children.

_____ 2. The higher the mother's viral load, higher the chances of HIV transmission to her infant.

_____ 3. The ELISA and Western Blot tests are used to detect the presence of HIV genes.

_____ 4. In study of 248 HIV infected children, majority of the children progressed to AIDS and died within the 1st year of life.

PART II - Short Answer

Directions: Read each item carefully. In the space provided, write a brief answer that addresses all aspects of the question.

5. Briefly define the following key terms from this lesson:

a) placenta _____

b) cesarean section _____

6. List the 4 methods of mother to child HIV transmission presented in this lesson:

a) _____

b) _____

c) _____

d) _____

7. List any 4 of the 7 developmental issues of children who are long-term survivors of HIV infection:

a) _____

b) _____

c) _____

d) _____

INFANTS, CHILDREN, and HIV

WHY STUDY INFANTS, CHILDREN AND HIV?:

The experience of HIV infected infants and children is vastly different from that of HIV infected adults. Information about transmission, treatment options, symptoms, and long-term affects of HIV infection as they relate to infants and children must be understood if service care providers hope to adequately meet the special needs of this population.

LESSON OBJECTIVES:

At the completion of this lesson, students will:

1. know the definitions of the lesson's key terms, so that they can correctly identify and/or define those terms presented on the chapter quiz.

2. correctly identify that the use of AZT during pregnancy can dramatically reduce the incidence of HIV transmission from mother to child

3. correctly list the 4 methods by which infants and children become HIV infected

4. accurately list any 4 of the 7 factors that can influence HIV transmission discussed in the lesson

5. correctly identify the major symptoms of OIs associated with this system, as listed on Appendix G.

6. correctly identify 4 of the 7 developmental issues seen in children who are long-term survivors of HIV infection.

KEY TERMS:

Attention Deficit Disorder (ADD)
cesarean section
ELISA
placenta
Polymerase Chain Reaction (PCR)
vaginal birth
Western Blot

LESSON CONTENT (SUMMARY):

Introduction:

As more and more women became HIV infected, the incidence of infected infants has climbed as well. Just as research has often not included women, it has also not included infants and children. In the early days of the epidemic, HIV testing of newborns was done only if it was already known that the mother was infected. Most infants tested positive, but did not get sick. Health care professionals were confused when at about 12-18 months, many of these infants no longer tested positive and never tested positive again or demonstrated any signs of infection.

Many infants and children died of infections, usually respiratory, commonly seen in AIDS without ever being tested for HIV. Most pediatricians who saw these cases thought that AIDS was only a "gay men's" disease. HIV infection was not considered in diagnostic work ups on these children. Even after infants and children were diagnosed with HIV, pediatricians worked without treatment standards for many years.

Fortunately today, there are treatment standards and pediatric specialists that treat HIV infected infants and children. As a result, life expectancy is continually improving for these infants and children.

Unfortunately, the incidence of infection among infants and children is climbing every year. Preventing HIV infection is the key. Research has shown the infection rate can be reduced from 35% to 8.5% when:

a) the mother's HIV status is known
b) an HIV infected mother follows medical standards of treatment during pregnancy
c) follow-up treatment standards for infants are followed, lasting at least two years.

Developmental delays, both physical and cognitive, are commonly seen in HIV infected children. It is thought, and research needs to support, that children have a lower rate of long term survival than adults. It is also thought that this is due to compromise experienced in normal growth and development.

Content Outline:

I. Transmission

A. The rate of HIV infection from mother to infant drops from 35% to 8.5% with the use of AZT during the last stage of pregnancy

B. Modes of transmission for infants and children:

C. Factors that can influence HIV transmission:

II. Testing Issues for Infants and Children

A. HIV Antibody Testing (ELISA and Western Blot)

B. Polymerase Chain Reaction (PCR)

III. Pediatric Progression of HIV

IV. Common OIs

A. Due to the incomplete development of infant's lungs at birth, the most significant and life threatening OIs clearly involve respiratory infections

1. bacterial pneumonia

2. viral pneumonia

3. PCP

B. Other common OIs

1. Encephalopathy

2. Failure to thrive/wasting

3. Lymphocytic interstitial pneumonitis or pulmonary lymphoid hyperplasia

4. Meningitis and/or septicemia

5. HIV associated malignancy (commonly Pulmonary Lymphoma's)

6. Thrombocytopenia

V. Developmental Issues In Long-Term Survivors (over 6 years)

This training has made me more equipped to handle problems that arise, and more aware of my limitations, in spite of my willingness to help in any way possible.

Waverly Gantt
Case Manager Assistant
ActionAIDS

APPENDICES

The following reference tools can be used to supplement the curriculum's lessons:

A • **Answer Guide: Lesson Quizzes**

This section provides answers for each of the lesson quizzes.

B • **Glossary of Terms**

This handout lists and defines the standard terminology HIV service care providers should be familiar with, and the terminology used throughout this curriculum's lessons.

C • **When To Wear Gloves**

This list provides 8 situations service care providers or home care workers may encounter when latex gloves should be worn to protect against exposure to blood borne and body fluid borne pathogens.

D • **Infection Control Recommendations for People with AIDS**

This handout lists practical suggestions designed to keep PWAs and those working with them safe from exposure to pathogens.

E • **HIV Disease Progression**

This chart provides the current classifications of HIV disease progression based on symptoms and T cell count.

F • **Secondary Health Precautions for Persons with HIV Infection**

This chart provides practical suggestions PWAs can use to ensure their daily activities are health promoting and not health threatening.

G • **Chart of Common HIV Disorders**

This chart list alphabetically the most common HIV-related disorders along with the cause, symptoms, and useful comments about each. The information on this chart is also presented in the charts that accompany lessons 4-11 (the review of the body's major systems and HIV's affect on them).

H • **Signs and Symptoms of AIDS Related Diseases**

This chart helps service care providersand consumers match non-specific symptoms, such as fever, weight loss, and skin lesions to various HIV-related opportunistic infections.

I • **Solutions to Common Eating Disorders**

This list provides suggestions for the common eating problems experienced by PWA.

ANSWERS TO LESSON QUIZZES

NOTE TO INSTRUCTORS:

All of the questions on the lesson quizzes have been drawn directly from the material presented in the "Process" section of each lesson plan. Although the answers to the True/False questions are fairly concrete, instructors may choose to accept answers other than those listed here for the Short Answer Questions, based upon the way s/he taught the material during the lesson.

STRUCTURE AND FUNCTION OF THE HUMAN CELL

PART I - True or False

Directions: Read each statement carefully. In the space provided, write the word "True" if the statement is true, or write the word "False" if the statement is false

True ____ 1. The three essential elements our cells need to function properly are air, water, and nutrients.

False ___ 2. The nucleolus is the energy producing "power plant" of the cell.

True ___ 3. Cytoplasm is the gelatinous fluid in which organelles float.

True ____ 4. The lysosomes contain enzymes which break down foreign objects and cellular by-products.

PART II - Short Answer

Directions: Read each item carefully. In the space provided, write a brief answer that addresses all aspects of the question.

5. Briefly define the following key terms from this lesson:

a) health: cells are functioning correctly

b) illness: cells are not functioning correctly

c) organelle: a component of a cell

6. Name and briefly explain three (3) situations that can result in cells not being able to perform their jobs effectively.

Any 3 of the following:

a) Skipping meals, crash diets, strenuous exercise prior to adequate food and fluids.

b) Not eating a well balanced diet or not drinking adequate water.

c) Consuming "junk food", improperly prepared food, over-processed food too many with additives and preservatives.

d) Inadequate water intake results in dehydration. All cellular functions are slowed and sometimes stop.

e) Organelles can become weakened due to inadequate water, food, and O2.

f) Because the cell's main goal is to continue to function, organelles will use the best of what is available in order to maintain cellular function, even if the best is defective or inferior.

g) High stress, disease, infection, sudden increase in exercise, long-term malnutrition can all cause a depletion of resources, shut-down of cell functioning, and even cell death.

h) The body maintains a priority system when allocating resources. With inadequate resources, the body will divert resources to the highest priority areas (e.g., the brain, lungs, heart, liver, kidneys). As a result, other "non-vital" systems (e.g., muscles, teeth, bones, skin, etc..) become weak and cell death may occur in these areas.

QUIZ: LESSON 2

STRUCTURE & FUNCTION OF THE IMMUNE SYSTEM

PART I - True or False

Directions: Read each statement carefully. In the space provided, write the word "True" if the statement is true, or write the word "False" if the statement is false

True 1. The immune system is designed to recognize, respond to, and eliminate foreign substances.

False 2. Intact skin is very vulnerable to invasion by antigens.

False 3. Macrophages are special white blood cells that are the "master minds" of the immune system.

True 4. B cells create and store antibodies.

PART II - Short Answer

Directions: Read each item carefully. In the space provided, write a brief answer that addresses all aspects of the question.

5. Briefly define the following Key Terms from this lesson:

a) antigen: a substance that is foreign to the human body.

b) normal flora: organisms that ordinarily live in the GI system which help prevent colonization of other organisms.

c) leukocyte: another name for blood cells

6. For each of the following levels of defense, write 1 sentence that summarizes its purpose:

a) protective surface phenomena: acts as a barrier against entry

b) general host defense: attempts to contain an antigen in the smallest possible area by setting up the inflammatory response.

c) specific host defense: identifies and reacts to specific antigens, keeps the immune response active until the antigen is destroyed, and turns off the immune response when the antigen is destroyed.

7. Briefly explain why it is important that the human immune response involve a clean-up function:

An aggressive immune response results in many damaged WBCs and RBCs. There are also many foreign particles in the blood stream and extracellular fluids. As a result, blood chemistry changes, and fluid and oxygen flowing in and out of cells around the site of invasion is slowed. This reduces the healthy functioning of cells and therefore interferes with the repair process. This immune system clean-up function is actually one of the first steps to repair and rebuilding following a damaging infectious process.

QUIZ: LESSON 3

AN OVERVIEW OF HIV

PART I - True or False

Directions: Read each statement carefully. In the space provided, write the word "True" if the statement is true, or write the word "False" if the statement is false

False 1. A virus is a specific kind of cell.

True 2. HIV is primarily transmitted through blood, semen, vaginal fluids, and breast milk.

False 3. The protective surface phenomena is fairly ineffective in keeping HIV out of the body.

False 4. CD4 proteins coat the outer surface of HIV.

True 5. The 3 classes of HIV disease progression are Infected-Asymptomatic, Symptomatic, and AIDS.

PART II - Short Answer

Directions: Read each item carefully. In the space provided, write a brief answer that addresses all aspects of the question.

1) Briefly define the following key terms from this lesson:

a) gp-120: HIV's docking arm

b) apoptosis: cell self-destruction

c) retrovirus: a virus that uses RNA as its "brains"

5. Briefly describe the process by which HIV changes the way a host cell things and does its job:

HIV uses RNA as its "brains". Using the reverse transcriptase, the virus converts some of its RNA into DNA. This DNA is then incorporated into the host cell's DNA. This affects how the host cell functions, and turns the host cell turns it into an HIV producing factory.

6. One of the characteristics that makes HIV difficult for the body to destroy is that it can change its structure quickly and often. Explain how this happens and why this characteristic makes HIV hard to control:

HIV can change its appearance so that the immune system cannot recognize it as HIV. The HIV particles that come out of an infected cell are often slightly different than the original particle that infected the cell in the first place because the virus mutates when replicating. When the HIV specific antibodies stored in the body come into contact with this slightly altered HIV, they do not recognize it as the invader it is programmed to seek and destroy, so they leave it alone.

THE LYMPHATIC SYSTEM AND HIV

PART I - True or False

Directions: Read each statement carefully. In the space provided, write the word "True" if the statement is true, or write the word "False" if the statement is false

True ___ 1. The flow of fluid in the lymphatic system is always one way, towards the heart

True ___ 2. The lymph system provides the body with a secondary circulation system to help handle the many functions
of fluid in the body.

False ___ 3. Lymphatic circulation consists of red blood cells (RBCs), white blood cells (WBCs), and plasma

False ___ 4. Once lymph nodes become infected with HIV, they are much better able to filter HIV out of the lymphatic fluid.

True ___ 5. Two symptoms of lymphomas are paralysis on one side of the body and loss of the ability to speak

PART II - Short Answer

Directions: Read each item carefully. In the space provided, write a brief answer that addresses all aspects of the question.

6. Briefly define the following key terms from this lesson

a) plasma: lymphatic system fluid

b) lymph node: a lymph filtering station

c) lymphadenopathy: swollen lymph glands

7. In class we discussed how the body utilizes a priority system when resources are limited. Briefly explain how this priority affects the lymphatic system when an HIV positive individual becomes dehydrated:

With inadequate fluid for circulation, the contents of the lymph system become sluggish and the system gets clogged. Immune cells get trapped and are not available to assist in the immune response. Over time, an abnormally high level of toxins, damaged cells, cell debris, excess immune cells, etc., can collect in the vascular circulatory system.

QUIZ, LESSON 5:

THE CIRCULATORY SYSTEM AND HIV

PART I - True or False

Directions: Read each statement carefully. In the space provided, write the word "True" if the statement is true, or write the word "False" if the statement is false

True___ 1. The chambers of the heart that receive blood from the lungs or body are called the atria.

False___ 2. The pulmonary circulation consists of blood flowing to all of the body's cells and back again.

True___ 3. HIV has little direct affect on the circulatory system.

True___ 4. An indirect affect of HIV on the circulatory system occurs when the heart is made to pump harder in response to decreased oxygen supply to infected lungs.

PART II - Short Answer

Directions: Read each item carefully. In the space provided, write a brief answer that addresses all aspects of the question.

5. Briefly define the following key terms from this lesson:

a) vital signs: blood pressure, pulse, and heart rate

b) vasodilatation: blood vessels open up wider to allow more flow

c) capillary network: the "tool booths" where the exchange of all products takes place

6. Briefly explain the difference between arteries and veins:
Arteries take blood away from the heart. Veins bring blood back to the heart.

7. Below is the chart we studied in class detailing vital signs. Fill in the blank spaces as indicated.

Age Group	Temperature	Pulse Rate	Respiratory Rate	Blood Pressure
Adults	**96.5 - 99.5**	60 - 100	12 - 20	**95/60 - 140/90**
Adolescents	97.6 - 98.8	**55 - 100**	**15 - 20**	104/60 - 142/92
3-12 years	**98 - 99**	70 - 120	**16 - 25**	85/50 - 132/86
0-3 years	98.5 - 99.5	70 - 175	**20 - 50**	******

QUIZ, LESSON 6:

THE RESPIRATORY SYSTEM AND HIV

PART I - True or False

Directions: Read each statement carefully. In the space provided, write the word "True" if the statement is true, or write the word "False" if the statement is false

True ___ 1. The lower respiratory system contains the trachea, bronchial tree, lungs, and diaphragm.

False ___ 2. Upper respiratory infections inhibit mouth breathing, which leads to a quick recovery for most PWAs.

True ____ 3. In general, lower respiratory infections are more dangerous to PWAs than upper respiratory infections.

True ____ 4. Dehydration indirectly affects the respiratory system by causing mucous to thicken, trapped antigens to stay in the lungs, and inhibiting the normal healing process of the lungs.

PART II - Short Answer

Directions: Read each item carefully. In the space provided, write a brief answer that addresses all aspects of the question.

5. Define the following key terms from this lesson:

a) cilia: tiny hairs which move in a wave-like motion towards the outside of the body.

b) pathogen: a disease causing organism

c) alveoli: tiny air sacs in the lungs where gasses are exchanged

6. Correctly identify the major symptoms of the following respiratory OIs

a) PCP: dry cough, shortness of breath, difficulty breathing, fever, night sweats, weight loss, fatigue, chest pain, sputum production in late disease

b) Candidiasis: quick-growing fungus appearing in the mouth, esophagus, lungs, bronchi, trachea, pharynx, oral and vaginal mucous, skin and GI tract. Mouth: white coating. Vagina: burning, itching, white discharge and coating, odor, redness, pain during intercourse. Esophagus: pain, difficulty swallowing

c) Pulmonary TB: fever, cough, spitting up blood, night sweats, weight loss, fatigue, swollen lymph nodes. Symptoms resemble those of PCP.

7. List 5 of the common symptoms related to disorders of the respiratory system that were named in the lesson:
Any 5 of the following:

a) Cough: moist, productive or dry
b) Chills
c) Difficulty breathing
d) Shortness of breath
e) Night sweats
f) Chest pain
g) High fever
h) Gray color to skin, nail beds, and mucous membranes

THE NERVOUS SYSTEM AND HIV

PART I - True or False

Directions: Read each statement carefully. In the space provided, write the word "True" if the statement is true, or write the word "False" if the statement is false

True ____ 1. The cerebrum controls higher functions in humans, while the cerebellum controls muscle tone and balance.

True ____ 2. The brain stem controls vital functions, such as cardiac functions and mediating auditory and visual information.

False ___ 3. Efferent messages go from the brain to the body while afferent messages go from the body to the brain.

False ___ 4. HIV cannot cross the blood-brain barrier. This is one of the reasons why the nervous system is so well protected against affects of HIV.

True ___ 5. Indirect affects of HIV on the nervous system can result from dehydration and drug interactions.

PART II - Short Answer

Directions: Read each item carefully. In the space provided, write a brief answer that addresses all aspects of the question.

6. Briefly define the following key terms:

a) neurons: conducting cells that send and receive messages

b) neuralgia cells: serve as support cells for neurons; provide fluid, nourishment, protection, and clean up waste

7. Briefly explain the significance of the blood-brain barrier

Helps to ensures the brain is less vulnerable to limited resources and invasion of pathogens than the rest of the body.

8. Briefly explain the structure and function of myelin:

Myelin is a lining of fat that covers neuralgia cells. It helps speed electrical impulses along nerve fibers.

9. List 3 common motor symptoms of nervous system disorders:
Any 3 of the following:

a) Muscle weakness
b) Loss of balance
c) Loss of motion or feeling on one side of the body
d) Seizures
e) Change in vision
f) Slowed muscle movement

10. List 3 common constitutional symptoms of nervous system disorders:
Any 3 of the following:

a) Fever
b) Headache
c) Lethargy
d) Night sweats
e) Nausea and vomiting
f) Weight loss

THE SKIN AND HIV

PART I - True or False

Directions: Read each statement carefully. In the space provided, write the word "True" if the statement is true, or write the word "False" if the statement is false

True ___ 1. At the skin's surface, epidermal skin cells overlap heavily to produce the tough surface of the skin.

True ___ 2. The dermal layer of the skin contains structures such as sweat glands, capillary beds, and lymphatic capillaries

True ___ 3. HIV has no direct affects on the skin.

False ___ 4. Skin is a high priority organ which receives excess fluids when limited fluids are available to the body.

PART II - Short Answer

Directions: Read each item carefully. In the space provided, write a brief answer that addresses all aspects of the question.

5. Briefly define the following key terms from this lesson:

a) epidermis: the top layer of skin used mostly as protection

b) hair: transports oil to the skin's surface and acts as a receptor of movement for the body

c) oil glands: secrete oil which helps keep the skin moist and also helps retain heat

6. List a major symptom or symptoms for the following skin-related OIs.

a) Herpes simplex: non-healing blisters lasting more than one month on the skin, especially around the anus, genitals, or mouth. Lesions are painful; can burn or itch.

b) Human papillomavirus: warts in the genital area, including vagina, vulva, cervix, penis, outer anus, and anal canal.

c) Idiopathic Thrombocytopenia Purpura: excessive bleeding from nosebleeds, injuries, or cuts. Some people bruise easily.

The Digestive System and HIV

PART I - True or False
Directions: Read each statement carefully. In the space provided, write the word "True" if the statement is true, or write the word "False" if the statement is false

False 1. The stomach adds water to food to help in the digestion process.

True 2. The small intestines contain thousands of finger like projections called villi.

False 3. The large intestine is much longer than the small intestine.

True 4. HIV directly affects the digestive system by interfering with the normal immune response to pathogens

PART II - Short Answer
Directions: Read each item carefully. In the space provided, write a brief answer that addresses all aspects of the question.

5. Briefly define the following key terms from this lesson:

a) liver: large accessory organ that filters toxins out of the blood and breaks down old blood cells. The liver also makes bile.

b) malabsorption: inflammation of the small intestine reduces the absorption of nutrients, even though they are available.

6. List 5 HIV-related eating problems that can affect nutrition:
Any 5 of the following:

a) Loss of appetite
b) Nausea
c) Vomiting
d) Diarrhea
e) Feeling full quickly
f) Difficulty of painful swallowing
g) Difficult of painful chewing
h) Taste changes
i) Shortness of Breath
j) Dementia
k) Strict dietary restrictions
l) Inadequate funds for food
m) Too tired to prepare food

7. List a major symptom of symptoms for the following digestive system OIs:

a) Wasting syndrome: profound involuntary weight loss, inability to absorb nutrients, chronic diarrhea, fever, weakness

b) Cryptosporidosis: severe diarrhea with frequent watery stools, abdominal cramping, nausea, vomiting, flatulence, weight loss, loss of appetite, constipation, dehydration, electrolyte imbalances, malaise, fever

c) Mycobacterium avium complex: persistent fever, weakness, night sweats, anorexia, weight loss, dizziness, nausea, abdominal pain, diarrhea, flu-like symptoms, shortness of breath, possible cough. Enlarged lymph nodes, frequently on one side; enlarged liver and spleen; soft tissue masses, particularly in the thigh)

8. List 4 constitutional symptoms that may be indicative of digestive system disorders:
Any 4 of the following:

a) Fever
b) Abdominal pain
c) Lethargy
d) Night sweat
e) Nausea and vomiting
f) Weight loss
g) Chills

NUTRITION AND HIV

PART I - True or False

Directions: Read each statement carefully. In the space provided, write the word "True" if the statement is true, or write the word "False" if the statement is false

True 1. Grains are the energy source that are most easily digested.

False 2. Milk products are not a good source of protein.

False 3. HIV infected individuals need less of the daily requirements of nutrients because they are usually less active than HIV negative people.

False 4. HIV infected individuals experiencing diarrhea should be encouraged to skip meals.

PART II - Short Answer

Directions: Read each item carefully. In the space provided, write a brief answer that addresses all aspects of the question.

5. Define the following key terms from this lesson:

a) protein: the building blocks of all muscle and organ cells

b) fat: broken down by cells and used as energy

c) vitamin: assists energy from digested foods in getting into cells for use

6. In the lesson, suggestions that can help PWAs increase the nutritional value of the foods they eat were provided. List any 4 of these:

Any 4 of the following:

a) add brown sugar to morning cereal
b) blend ice cream into morning juice
c) be generous when using butter or margarine on bread or muffins
d) eat cream soups
e) add lots of butter to potatoes and rice
f) add lots of mayonnaise to your sandwiches
g) add ice cream to apple sauce or other fruit
h) add cream to fruit

THE SPECIAL CONCERNS OF WOMEN AND HIV

PART I - True or False

Directions: Read each statement carefully. In the space provided, write the word "True" if the statement is true, or write the word "False" if the statement is false

False___ 1. Cultural, gender, and economic standards often make it easier for women to adopt preventative behaviors that help reduce the risk of HIV infection.

False___ 2. HIV infected men get far more STDs and far more serious STDs than HIV infected women.

True___ 3. A common HIV-related disorder for women can be menstrual changes.

False___ 4. Women are not susceptible to many of the OIs that HIV infected men get.

PART II - Short Answer

Directions: Read each item carefully. In the space provided, write a brief answer that addresses all aspects of the question.

5. Briefly define the following key terms from this lesson:

a) cervix: the lower portion of the uterus containing the opening to the uterus from the vagina

b) PAP smear: a laboratory test in which cells are scrapped from the cervix for examination

c) ectopic pregnancy: a pregnancy which takes place in the Fallopian tubes rather than the uterus

6. List any 4 of the 6 early gynecological signs and symptoms specific to HIV+ women that we discussed in this lesson:

Any 4 of the following:

a) Infections are often symptom free
b) Vaginal discharge, with or without: odor, color, texture
c) Pain during intercourse
d) Miscarriage, or ectopic (tubal) pregnancy, or infertility
e) Painful urination
f) Vaginal itching and/or burning and/or redness

7. List the 4 diagnostic and preventive practices for HIV+ women discussed in this lesson:

a) GYN and PAP smear every 6 months (every 3 months when T cell <200)
b) Vaginal cultures (for bacterial and viral STDs)
c) Blood test for syphilis (sometimes a spinal tap is needed)
d) Anal culture if warts are involved

QUIZ, LESSON 12:

INFANTS, CHILDREN, AND HIV

PART I - True or False

Directions: Read each statement carefully. In the space provided, write the word "True" if the statement is true, or write the word "False" if the statement is false

False____ 1. Younger women and older women have less chance of transmitting HIV to their children.

True___ 2. The higher the mother's viral load, higher the chances of HIV transmission to her infant.

False__ 3. The ELISA and Western Blot tests are used to detect the presence of HIV genes.

False__ 4. In study of 248 HIV infected children, majority of the children progressed to AIDS and died within the 1st year of life.

PART II - Short Answer

Directions: Read each item carefully. In the space provided, write a brief answer that addresses all aspects of the question.

5. Briefly define the following key terms from this lesson:

a) placenta: an organ which connects the fetus to the mother by means of the umbilical chord. The placenta allows the fetus to get O2 and nutrients and carries CO2 from the fetus to the mother

b) cesarean section; surgical delivery of a baby by cutting through the uterus, as opposed to vaginal birth

6. Briefly explain the affect of an HIV infected woman taking AZT during her pregnancy:

The rate of HIV infection from mother to infant drops from 35% to 8.5% with the use of AZT during the last stage of pregnancy. This infection rate could drop further if AZT is used earlier in pregnancy or with combination therapy

7. List the 4 methods of mother to child HIV transmission presented in this lesson:

a) Through the placenta prior to birth
b) Through the ingestion of maternal blood during delivery
c) Though their mother's breast milk
d) Through blood transfusions received at birth or after birth

8. List any 4 of the 7 developmental issues of children who are long-term survivors of HIV infection:

Any 4 of the following:

a) Short in statue and commonly below average weight.
b) Learning disabilities
c) Attention deficit disorder (ADD)
d) Delayed speech
e) Loss of motor and neurological skills previously mastered
f) Visual and hearing deficit
g) Poor school attendance due to frequency of OIs, need for frequent medical appointments, and hospitalizations.

This training has helped me understand about medications and their side effects.

Eda Garcia
Case Manager Assistant
ActionAIDS

Glossary Of Terms

A A

acupuncture: therapy in which needles are applied to meridians (set points of the body). The precise disorder treated or the degree of anesthesia required determines the temperature of the needle used, the angle of insertion, the speed of insertion and withdrawal.

acute: rapid in onset; severe, life-threatening. The opposite of persistent, chronic, or long-term.

adverse reaction (side affect): participants in clinical trials may have reactions to the experimental medicines. Toxic reactions are usually listed in the protocol and the participant's Informed Consent. However, some reactions may never have been reported before. Any amount of toxicity must be reported within 24 hours by telephone to the sponsor of the trial, who then must tell the FDA. A clinical trial can be stopped because of an adverse reaction. Approved drugs can also have side affects. All side affects that may be caused by an approved drug are listed on the labeling.

aerosolized: a form of administration in which a drug, such as pentamidine, is turned into a fine spray or a mist by a nebulizer. The drug is then inhaled.

AIDS Clinical Testing Unit (ACTU): the sites where NIAID's AIDS drug clinical trials are performed.

AIDS Clinical Trials Group (ACTG): the federal AIDS drug testing organization.

AIDS: acquired immunodeficiency syndrome

allergy: an immediate or delayed immune reaction caused by a substance such as dust, a drug, or other foreign material that causes an allergic reaction amebiasis: infection caused by a tiny animal parasite which lives in the human large intestine.

alternative therapies: treatments, usually natural and non-toxic, used to promote healing

anemia: a condition which occurs if the blood cannot carry enough oxygen to nourish tissues. Common symptoms of anemia are fatigue, headache, and shortness of breath. Anemia may be caused by too few red blood cells or too little hemoglobin or both.

anorexia: prolonged loss of appetite that leads to significant weight loss.

antibody: a chemical substance created to specific antigen

antigen: a substance foreign to the body such as bacteria, fungus, and virus

antiviral: treatments that control or stop a given virus

apoptosis: a process the body uses to eliminate cells no longer useful

ARC: aids-related complex (a term no longer used to differentiate HIV progression)

assay: a test.

asymptomatic: infection without symptoms. Someone who is asymptomatic has antibodies to HIV but does not have any visible signs or symptoms of HIV infection.

B **B**

B cell: the white blood cell that carries antibodies and releases in the presents of the specific antigen

B symptoms: fever, night sweats, weight loss.

baseline bloodwork: the results of blood tests done for the first time, later results are compared against

bronchoscope: insertion of a thin, flexible tube into the lungs through the nose or mouth. Often used as a diagnostic tool for PCP.

C **C**

cancer: a large group of diseases characterized by uncontrolled growth and spread of abnormal cells.

candidiasis: a fungal infection, often seen as white patches in the mouth called thrush. Can cause vaginal candidiasis and disease in other parts of the body.

catheter: a device that allows drugs to be given on an ongoing basis. A catheter is put in the chest during a minor operation.

CBC: "complete blood count", the actual counting of individual cells in a drop of blood

CD4 cells: (same as T4 cell) cell that orchestrates the complex immune system

CD8 (T8): a protein embedded in the cell surface of a suppressor T-lymphocytes.

cell: the basic unit of all living tissue.

cervical dysplasia: abnormal tissue development of the lower part of the uterus; may progress to cancer of the uterus.

chlamydia: a bacterial infection that can cause disease. Left untreated it can lead to cancer.

CMV retinitis: a herpes infection in the eye which can cause blindness. It is common in people with AIDS. People with CMV retinitis must take treatment for the rest of their life.

cofactors: elements influencing the progression of a condition/disease (some HIV cofactors: repeated HIV exposure, D&A abuse, smoking, poor nutrition, stress).

colitis: inflammation of the colon, part of the intestines.

combination therapy: the use of two or more drugs as treatment. Also, the use of two or more types of treatment in combination, alternately or together.

comparison trial: a trial in which experimental drugs are tested against each other or against an approved drug.

compassionate use IND: people who are seriously ill can have their doctor ask the drug company to give then an experimental drug they think will help them. Few drugs are available through this program, but they are usually free.

complementary treatment: treatment that adds benefit to an existing treatment plan

complete blood count (CBC): series of tests including cell counts, hematocrit, hemoglobin, and cell volume measurement.

cryptococcal meningitis: a fungal infection of the brain and spinal cord. Symptoms include severe headache, dizziness, nausea, weight loss, vision disorders and mental deterioration. Meningitis with headache, blurred vision, confusion, dizziness, nausea, anorexia, agitation or slurred speech are common symptoms.

cryptosporidiosis: an infection whose main symptom is prolonged diarrhea which leads to weight loss. All treatments for this illness are still experimental.

cytomegalovirus: a virus related to the herpes family, CMV infections may occur without any symptoms or may result in flu-like symptoms of aching, fever, mild sore throat, weakness or enlarged lymph nodes. In AIDS, severe CMV infections can cause illnesses such as hepatitis, pneumonia, retinitis, and colitis, leading in some cases to blindness, chronic diarrhea, and death.

D **D**

definitive diagnosis: a diagnosis based on actual scientific test results

dementia: loss of memory and other intellectual functioning caused by HIV or other diseases.

diagnostic procedure: a procedure or test used to diagnose a given condition

disease: a condition of abnormal functioning, an illness marked by a specific set of signs and symptoms

DNA: a complex protein that carries genetic information, found primarily in the cell nucleus

docking arm: the gp-120 protein that protrudes from HIV and has an affinity for CD4 protein found on many cells of the immune system and brain

dormancy: the period an organism in the body is not producing any ill affects

dose escalation trial: in this type of trial, one or a few people, usually under a dozen, take a small amount of the
drug. If it doesn't hurt them, one or a few more take a larger amount. This continues until the researchers find the largest amount of the drug that can be taken without immediate harm.

double-blind: a type of drug trial in which people are divided into different groups. One group takes the experimental drug and other groups take different doses, the standard therapy, or placebo. Neither the researchers nor the person in the trial knows who is taking what until after the trial is over.

E **E**

efficacy: the greatest ability a drug has to create benefit, regardless of the dosage

encephalitis: inflammation of the brain. Symptoms include headache, neck pain, fever, nausea, and vomiting. Nervous system problems may occur such as laziness, paralysis, weakness, and coma. Treatment includes antibiotics for infection, steroids to reduce brain swelling, medicine to control fever and headache, and prolonged bed rest. Several types of opportunistic infections can cause encephalitis.

enzyme: a protein that speeds up or causes chemical reactions in living matter

Epstein-Barr virus (EPV): a herpes-like virus that causes one of the two kinds of mononucleosis (the other is caused by CMV).

expanded access: programs designed to make experimental drugs available on a wide basis to people who do not qualify for the drug trials or who live too far from a trial site.

experimental drug: a drug that has not been approved for use as a treatment for a particular condition.

F F

floaters: floating dark spots within the field of vision. They can be caused by CMV retinitis, but also appear in some persons as a

fungus: a general term used to denote a class of microbes including mushrooms, yeast, and molds. Fungi cause infections such as thrush, cryptococcal meningitis, and toxoplasmosis.

G G

gastroenteritis: inflammation of the lining of the stomach and intestines.

generic name: the name given to a drug regardless of the producing drug company

genetic code: the instructions within the cell that makes it function in a specific fashion

gp-120 (glyco protein 120): the scientific name of the substance known as the "docking arm"

H H

hairy leukoplakia: a whitish, slightly raised lesion that appears on the side of the cheeks, gums or tongue. Thought to be related to Epstein-Barr Virus infection (OI).

helper cell: (T4, CD4) a subset of T cells that carry the T4 marker and are essential for turning on antibody production, activating cytotoxis T cells, and initiating other immune responses.

hemoglobin: the protein in red-blood cells responsible for carrying oxygen.

hemophilia: an inherited disease that prevents the normal clotting of blood.

hepatitis B (HBV): a viral liver disease that can be acute or chronic and even life-threatening, particularly in people with poor immune resistance.

herpes simplex virus (HSVI): a virus which causes cold sores or fever blisters on the mouth or around the eyes and can be transmitted to the genital region. The latent virus can be reactivated by stress, trauma, other infections, or suppression of the immune system.

herpes simplex virus II (HSV II): a virus causing painful sores of the anus or genitals which may lie dormant in nerve tissue and can be reactivated to produce the symptoms. HSV II may be transmitted to a baby during birth.

herpes zoster: also called shingles, consists of very painful blisters on the skin that follows nerve pathways. Treatment with acyclovir is highly recommended.

hickman catheter: a flexible, needle shaped tube which can be surgically placed in a large blood vessel and held in place for a long period of time.

Histoplasmosis: a hormone/chemical transmitter involved in local immune responses, in regulating stomach acid production and in allergic reactions.

HIV asymptomatic: the period after HIV infection and before related symptoms appear

HIV disease: a term used to describe a variety of symptoms and signs found in people who are HIV positive. These may include recurrent fevers, unexplained weight loss, swollen lymph nodes, and/or fungus infection of the mouth and throat. Also commonly described as symptomatic HIV infection.

HIV infection: related to the bodies response to being infected by the HIV virus

HIV symptomatic: the period after the first HIV symptoms appear

Hodgkin's disease: a progressive malignant cancer of the lymphatic system. Symptoms include lymphadenopathy, wasting, weakness, fever, itching, night sweats and anemia. This disease is treated with radiation and chemotherapy; newer combinations of anti-cancer drugs are being tried constantly with increasing success.

host cell: the cell that HIV enters and ultimately infects

I **I**

IDU: an injection or intravenous drug user (IVDU).

immune modulator: a treatment intended to stimulate the production of immune cells

immune response: the body's response to antigens, meant to protect the body from illness

immune system: a combination of cells and organs that work together to prevent illness

immunity: a natural or acquired resistance to a specific disease. Immunity may be partial or complete; long lasting or temporary.

immunization: to protect against disease by vaccination, usually with a weak form of the agent that causes illness. People are usually immunized against a disease by getting vaccinated, although having a disease one time usually prevents or "immunizes" you from getting it again. This may not always be true with people who are HIV positive.

immunomodulators: drugs hoped to strengthen the immune system and help the body fight off opportunistic infections or other diseases that attack people with AIDS. Not necessarily used to stimulate the immune system, which may be harmful . This includes two sub-groups: cytokines and "broad acting" immune modulators. Broad acting immune modulators are chemical transmitters/hormones in the body which regulate the immune system (i.e., endorphins) or act in a similar fashion.

infection: illness caused by the multiplication of pathogens

infectious: capable of causing infection

informed consent: type of protection available to people considering entering a drug trial. Before entering the trial, participants must sign a consent form that contains an explanation of a) why the research is being done; b) what researchers want to accomplish; c) what will be done during the trial and for how long; d) what risks are in the trial; e) what benefits can be expected from the trial; f) other treatments available; and g) the right to leave the trail at any time.

infusion: the process of giving a substance (medication, food supplements, etc.) to an individual by injecting it into a vein. This procedure can either be a one-time event or continued over many hours, days, or event months.

interferon: a substance that is produced when the body senses an infection with a virus. Interferon is released to coat uninfected cells so that they don't become infected. There are three main classes of interferon alpha, beta, and gamma.

interleukin: a natural blood substance that helps immune system cells to communicate.

intestinal malabsorption: a condition in which the nutrients found in food are not absorbed by the body. It can lead to malnutrition and weight loss.

intravenous (IV): drugs injected directly into the veins.

K **K**

Kaposi's sarcoma (KS): a cancer of the blood vessels that may occur in people with AIDS. Blood vessels which grow rapidly and cause pink to purple, painless spots on the skin. Lesions may first appear on the feet or legs and on the soft palate of the mouth. They may also remain hidden in the internal organs. KS can also grow in other places such as the lungs. It can be accompanied by fever, enlarged lymph nodes and stomach problems.

Karnofsky score: a measurement system for how you perform everyday tasks. If you can eat and get dressed by yourself, then you probably have a high Karnofsky score. It goes down as you need more help in doing things.

L L

latency: the period when an organism is in the body, but is not producing any ill affects. HIV is never really latent, although you may not have symptoms or feel bad. any pathological or traumatic discontinuity of tissue, which may cause a loss of function (of the affected or surrounding tissue).

leukocyte: a white blood cell, there are five different types

leukocytes: all white blood cells

leukopenia: lower than normal level of leukocytes in the blood

lymph glands: small immune system centers that are located all over the body. Lymph glands protect the bloodstream from infection by filtering out infectious particles.

lymph node: small oval structure (hundreds in the body) that filter lymph fluid, fight infection, and produce some WBCs

lymphadenopathy: swollen, firm and possibly tender lymph glands. The cause may range from a temporary infection such as the flu, HIV, mononucleosis, to lymphoma (cancer of the lymph nodes).

lymphocyte: B cells and T cells, a groups of WBCs, usually make up 25% of all circulating WBCs, increase during infection

lymphoma: a cancer of the cells that are responsible for normal immune function. A type of cancer that may include symptoms such as lymph-node swelling, weight loss, and fever. The type of treatment depends on the appearance of the lymphoma under the microscope as well as the extent of the spread of the lymphoma. Treatment can involve either radiotherapy or chemotherapy, or a combination of both. In most cases of Hodgkin's disease and about 50% of non-Hodgkin's lymphoma, treatment can result in a cure.

M M

MAC: see mycobacterium avium complex

macrophage: a type of WBC, activates the immune repines and helps clean-up after antigens are destroyed

magnetic resonance imaging (MRI): a non-invasive diagnostic technique that can provide information on the form and function of internal tissue and organs of the body.

maintenance therapy: use of a treatment or treatments even after the disease has been brought under control. Unless maintenance therapy is used against PCP pneumonia, for example, the disease will probably occur again.

malabsorption syndrome: decreased intestinal absorption resulting in loss of appetite, muscle pain, and weight loss.

meningitis: inflammation of the brain and spinal cord that is usually caused by bacteria or a virus.

mycobacterium avium complex (MAC): a disease caused by an organism found in soil and dust particles. In PWAs, it can spread through the bloodstream to infect many parts of the body. Symptoms of MAC include prolonged wasting, fever, fatigue and enlarged spleen. It is usually found only in individuals who have T cells under 100. Though there is no cure, many different combinations of drugs are used to treat MAC which is also referred to as MAI.

N **N**

neuropathy: any abnormal, degenerative or inflammatory state of the peripheral nervous system.

night sweats: extreme sweating which happens during sleep. Night sweats are considered a symptom of HIV only when the body is drenched. Slight sweating is not a symptom.

non-Hodgkin's lymphoma (NHL): a rare B-cell lymphoma that is seen in AIDS.
normal part of the aging process. An HIV-knowledgeable eye doctor can make a correct diagnosis.

nucleus: the core of a cell.

O **O**

OI treatment: substances or regimens used to cure or stop the progression of an opportunistic infection.

OI: opportunistic infection (see below).

open trial: a drug trial is "open" when doctors and participants know which drug is being administered, as opposed to a double blind trial in which they do not know (some may receive a test drug or a placebo) until the trial is over.

opportunistic infection (OI): certain illnesses (such as PCP pneumonia) that people with AIDS can get and which can be life threatening. People with healthy immune systems do not usually get these illnesses, even though most people have the organisms that cause these illnesses in their body already. Only when the immune system is damaged can the organisms take advantage of the "opportunity" of this weakened state and cause damage.

P **P**

pancreatitis: the pancreas is an organ of the human body attached to the small intestine, just past the stomach. The pancreas produces natural chemicals that digest food. Pancreatitis is a swelling or infection of this organ. Pancreatitis causes severe stomach pain and illness.

parasite: an animal or plant that lives inside or upon another living animal or plant without extending any benefit to it in return. Parasites kill millions of people worldwide every year, although some parasites are harmless. The usual means of infection is through contaminated water or poor washing habits.

pathogen: a disease causing organism.

PCR: see polymerase chain reaction assay

peripheral neuropathy: a disorder of the nerves, usually involving the hands, feet, arms and legs. Symptoms may include numbness, a tingling or burning sensation, sharp pain, weakness and abnormal reflexes. In severe cases, paralysis may result. This condition can often be successfully treated.

Phase I study: the first step in human testing of a drug. Designed to evaluate toxicity at different dose levels. Takes place with a small number of participants.

Phase II study: FDA drug testing phase for effectiveness in humans. The stage at which drug effectiveness is established. Proceeds only if Phase I studies show toxicity to be within acceptable levels. Usually involves 50-300 volunteers.

Phase III study: FDA drug testing phase for extensive clinical trials in humans. Expansion of phase II study to 300 too 3,000 volunteers. Designed to back up information gathered in Phase I and II testing. Also compares the drug to other agents, either alone or in combination.

placebo: a substance that has no affect on the body (often referred to as a sugar pill) that is given to one group in a placebo-controlled trial. In placebo-controlled drug studies, a placebo is given to one group of participants, while the drug being tested is given to another group. The results obtained in the two groups are then compared.

platelet: a blood cell that helps wounds to heal. Platelets also produce other helpful chemicals. HIV can decrease platelets and cause bleeding and other disease. A normal platelet count is between 200,000 to 300,000.

PPD: a test for tuberculosis. If you are PPD positive you have been exposed to tuberculosis This does not mean that you have the disease, although everyone who is PPD positive must be treated to avoid getting a serious and contagious form of tuberculosis.

presumptive diagnosis: diagnostic procedure in which the practitioner assumes an infection is present from symptom observation and any other monitoring techniques that do not include actually seeing or performing a culture or biopsy of the virus, bacteria, or toxin.

progression: the process of disease advancement.

progressive multifocal leukoencephalopathy (PML): a viral infection of the brain that causes memory loss, motor control problems and loss of strength. PML can lead to coma and death.

prophylactic treatment: substances given to prevent disease.

prophylactic: a drug that helps to prevent a disease before is occurs. For example, Bactrim is a prophylactic treatment that prevents PCP pneumonia.

prophylaxis: taking a drug to prevent from getting an illness.

protease inhibitors: an antiviral drug that blocks the use of protease enzymes in HIV replication

protease: a substance in the blood that breaks down proteins. Protease inhibitors inhibit that the protease the HIV virus needs to grow. Sometimes spelled proteinase.

protocol: the plan for a clinical trial. A protocol explains why an experimental treatment is being studied and how it will be tested. A detailed plan which states a drug trial's rationale, purpose, drug dosages, length of treatment, how the drug is given, and who may participate (inclusion/exclusion criteria).

R R

resistance: the ability of a disease to overcome a drug. For example, after long-term use of AZT, HIV can develop strains of virus in the body that are no longer suppressed by this particular drug, and therefore are said to be resistant to AZT.

retrovirus: a class of viruses that replicate from RNA, as opposed to most viruses, which replicate from DNA.

reverse transcriptase: a retroviral enzyme that is capable of copying RNA into DNA, essential for HIV replication.

RNA: a complex protein that carries genetic information.

S **S**

secondary prophylaxis: treatments given to prevent recurrence of a disease after the patient has had the disease and has been cured.

seroconversion: when the HIV-antibody blood test changes from negative to positive.

STD: a sexually transmitted disease.

suppressor T cells: T cells that turn other T cells off.

surrogate markers: T4 cells are used as a surrogate marker in people who are HIV positive. The T4 cell count itself is not really a direct measure of HIV, but a sign that disease is occurring. The T4 cell count is then said to be a surrogate marker for HIV. Different surrogate markers are being studied to see how well they measure the progress of HIV. Viral load is another surrogate marker.

symptom: a sign that the body is going through a process. A fever is a symptom of the body fighting off an infection. A rash is a symptom that the immune system is reacting to something such as dust.

syndrome: a group of symptoms and/or diseases that are characteristic of a specific condition.

T **T**

T cells: white blood cells that play an important part in the immune system. There are three different types of T cells, each of which has different subsets. The commonly measured T cells are helper T cells, killer T cells, and suppressor T cells.

T4 cell: (same as CD4 cell) cell that orchestrates the complex immune system

T8 cell: the bloodstream from infection by filtering out infectious particles.

toxic reaction: a poisonous or unwanted reaction to a vitamin, drug or other substance. A toxic side affect is when a helpful medicine also causes some damage to the blood or body. Toxicity is a measurement of how much damage may be caused.

toxicity: the extent, quality, or degree to which a substance or treatment is harmful to the body.

toxoplasmosis: an inflammation of the brain caused by toxoplasma gondii, a parasite. Frequently causes inflammation of the brain. It may also involve the heart, lung, adrenal glands, pancreas, and testicles. This disease is usually mild but it can cause fever and swollen glands, as well as severe headaches. Fifty percent of Americans have been exposed to toxoplasma gondii at some point in their lives.

tuberculosis (TB): an infection caused by Mycobacterium tuberculosis. Treatment consists of the administration of a combination of antibacterial drugs, usually for at least nine months.

V V

vaginal candidiasis: infection in the vagina with thrush. Presents with pain, itching, redness and white patches in the vaginal wall. Much more common and more difficult to treat in women with HIV infection.

viral core: the nucleus, or center, of a virus.

viral load: the measure of HIV RNA in the blood (a blood test) or tissue (a tissue biopsy of lymph nodes, liver, lungs, or brain). The results provide an indication of the amount of HIV replication at a given point in time. The same lab needs to be used for all repeat tests, this is because there are several different test methods that give different results. The test needs to be run on the same day it is drawn.

virus: the smallest known infectious organism. A group of infectious agents characterized by their inability to reproduce outside of a living cell. They are unable to live or multiply outside of a host cell since most do not possess the means to synthesize protein.

W W

wasting syndrome: severe weight loss involving depletion of muscle mass in people with AIDS and HIV positive individuals which can occur even in the absence of other infections. Unwanted weight loss of more than 10% of body weight plus either chronic diarrhea or chronic weakness and fever for more than 30 days. Treatment is required.

white blood cells: part of the immune system that protects the body against foreign substances such as disease-producing microorganisms.

window period: the time between HIV infection and seroconversion.

Because of the training, my clients are more likely to ask me questions and request that I go with them to their medical and clinical appointments. They feel much more comfortable when I am able to go with them. And it gives me the chance to remind them of the questions they had for the doctor. I have made it very clear to all of them that they need to call and ask the doctor for advise. My job is to make them realize that they are capable of making educated decisions and they have choices.

Vivian Cooperman
Case Manager Assistant
PCHA

APPENDIX C

When to Wear Gloves

The rule of thumb regarding wearing gloves is that gloves are needed whenever you are exposed to any open lesions or are dealing with tubes or fluids that have been in the client's body but are now outside of the body.

Examples of this include (this is not a complete list):

1. Bathing a client with open lesions
2. Changing bedding that is visibly soiled
3. Dealing with any bleeding situation
4. Changing any kind of dressing
5. Cleaning up fecal incontinence, including changing diapers
6. Providing oral or nasal care
7. Shaving a client
8. Taking a rectal temperature

The training specifically contributes to my job. As CMAs, we have to educate the clients on the importance of their medication and how critical it is for them to take it on time. I encourage them to be open with their medical providers by explaining all their symptoms, so that the doctor can conduct tests to make a diagnosis.

Jennifer Figueroa
Case Manager Assistant
Congreso de Latinos Unidos

Infection Control Recommendations For People With AIDS

People with AIDS can safely live with, work with, and play with healthy individuals and with other persons with AIDS. Certain common sense hygienic measures protect both the person with AIDS as well as his/her house mates, co-workers, and service providers.

General Information

1. Maintaining a state of personal cleanliness is helpful to both the person with AIDS and others. This includes bathing regularly.

2. Kitchen and bathroom facilities may be shared with others. Normal sanitary practices in any household will prevent the growth of fungi and bacteria that may potentially cause illness.

3. Dishes may be shared with others provided they are washed in **hot** soapy water and rinsed with **hot** water. A disinfectant does not need to be used.

4. Towels and wash cloths should not be shared without laundering first. Toothbrushes, razors, enema equipment, thermometers, and sexual toys should not be shared.

Handwashing

5. Wash hands after the use of the bathroom facilities or contact with one's own bodily fluids such as semen, vaginal secretions, mucous, or blood.

Wearing Gloves

6. There should be no exchange of body secretions particularly blood, semen, and vaginal secretions. If contact with body fluids cannot be avoided, ALWAYS wear gloves when handling bodily secretions or discharge.

7. Gloves need to be worn when:
   - Bathing a client with open lesions
   - Changing bedding that is visibly soiled
   - Dealing with any bleeding situation
   - Changing any kind of dressing
   - Cleaning up fecal incontinence, including changing diapers
   - Providing oral or nasal care
   - Shaving a client
   - Taking a rectal temperature

Food Preparation

8. Wash hands before preparing food.

9. Sponges used to clean the floor or any body fluid spills SHOULD NOT BE USED TO WASH DISHES OR CLEAN FOOD PREPARATION AREAS.

10. Sponges used to clean up spills should not be washed out at the sink where food preparation occurs.

11. People with AIDS can safely cook for others provided they wash their hands before beginning. No one should lick their fingers or taste from the mixing spoon or pot while cooking.

12. Use pasteurized milk and milk products. Avoid raw eggs.

Cleaning Kitchens

13. Clean kitchen counters with usual cleaning products. Use scouring powder to remove stubborn food particles.

14. Sponges used to clean in the kitchen where food is prepared should NOT be the same sponge used to clean up bathroom-type spills. Dirty looking sponges should be discarded.

15. Clean inside the refrigerator with soap, water, and baking soda to control molds.

16. Mop kitchen floor at least once a week with the usual cleaning products and clean up spills as they occur.

Cleaning Bathroom

17. Mop bathroom floor at least weekly and clean up spills as they occur. Use 1:10 strength bleach (1 part bleach to 10 parts water) can be used to disinfect floor and shower floor (athlete's foot is caused by a fungus which bleach will kill).

18. Bleach can also be used in the sink. A little full strength bleach can be poured into the toilet bowl for disaffection.

19. Mop water should NOT be poured down the sink where food is prepared, use the toilet.

General Cleaning

20. Any spills of body fluids or waste (blood, urine, stool, vomit, etc.) should be cleaned up first using paper towels and then the surface should be disinfected with 1:10 bleach or other bathroom cleaner.

21. Sponges towels, dishcloths, and mops can be disinfected by soaking in 1:10 bleach for five minutes (longer may disintegrate the material).

Trash

22. Never use bare hands to press down a bag of trash. Use gloves when touching trash followed by handwashing.

23. Trash disposal should be the same for any household. Body wastes should be flushed down the toilet. Other trash may be adequately handled by normal means.

24. In the event of large amounts of sputum, wound drainage, etc.. on tissues or dressings, it is a good idea to collect them in a plastic lined trash can in the house.

25. Needles and syringes should be disposed of in a closed-covered, rigid container (i.e., a coffee can). DO NOT RECAP NEEDLES.

Pet Care

26. Persons infected with HIV should wear gloves when cleaning bird cages (psittacosis). Persons infected with HIV should wear gloves and a mask when cleaning cat litter boxes (toxoplasmosis).

27. Tropical fish tanks may contain organisms with the Mycobacterium family which are not well tolerated by persons with AIDS. Get someone else to clean your tank.

Ventilation

28. Keep living quarters well ventilated. Airborne diseases are less likely to be a problem when diluted by lots of air.

29. Persons with AIDS who are coughing should cover their mouths with tissues or handkerchiefs. Dispose of tissues as soon as possible.

Wound Care

30. Open cuts and wounds exposed to virus-bearing fluids: wash exposed surface with either a solution of 3% hydrogen peroxide in water or a solution of 10% household bleach (such as Clorox) in water.

31. Skin not open or lacerated or otherwise exposed: wash exposed skin with soap and water and wipe surface with either a 70% (or higher) solution of isopropyl alcohol or a solution of 3% hydrogen peroxide.

HIV Disease Progression

HIV progression is currently classified into two prognostic categories: T cell count, and the degree on symptoms experienced. Each category has three possibilities. This makes nine possible stages of HIV progression.

T cell count	Clinical categories		
	A	B	C
Over 500	• A1	• B1	• C1
200-499	• A2	• B2	• C2
under 200	• A3	• B3	• C3

Category A

- No symptoms
- Symptoms of primary infection
- Swollen lymph nodes

Category B

- No symptoms from category C
- Chronic candidiasis
- Fever over one month
- Diarrhea over one month
- Bleeding or problems with small blood vessels
- Persistent pelvic inflammatory disease
- Peripheral neuropathy

Category C

- Candidiasis of esophagus, bronchi, trachea, or lungs
- Invasive cervical cancer
- Coccidiocisis out-side of the lungs
- Cryptococcsis out-side of the lung, or intestine for over one month
- Cytogelalovirus affecting organs other than: liver, spleen, or lymph nodes
- HIV Encepholopathy
- Herpes simplex around mouth over one month
- Herpes in lungs or esophagus
- Hisoplasmosis out-side of the lungs
- Isosporosis intestinal over one month
- Kaposi's sarcoma
- Tumors of lymphatic tissues or in brain
- TB
- Mycobacterium avium out-side of lungs
- Pneumocystis carinii pneumonia
- Progressive multifocal leukoencephalopathy
- Salmonella septicemia
- Toxoplasmosis of brain
- Wasting syndrome

The training contributed a lot to my job since I deal with a population that is very ill. The training and knowledge I received from this training has given me confidence in myself. And I now find myself applying this knowledge to different situations. I feel good about myself.

Milagros Vazquez
Case Manager Assistant
Congreso de Latinos Unidos

Secondary Health Precautions for Persons with HIV Infection

Ways to maintain health and avoid illness

Activity	Precaution
Skin Care	• Shower daily (no tub baths) • Use a mild, non-perfumed soap • Avoid lotions with alcohol (drying to skin)
Hair Care	• Use mild shampoo • Use a conditioner • Use non-perfumed products • Only once or twice a week (to reduce hair loss) • Comb hair (avoid brushing)
Mouth Care	• Use soft toothbrush • Use non-abrasive toothpaste (avoid brushing gums and tongue) • Mouth care with baking soda three times a day
Handwashing	• Frequent handwashing after activities of daily living • Use a mild soap • Use a pump dispenser (avoid bar soap) • Use warm water (avoid hot water) • Rinse the skin of soap thoroughly • Wear rubber gloves when cleaning (avoid harsh chemicals on skin) • Use proper handwashing technique
Nutrition	• Eat high-protein, high-calorie diet • Eat small frequent meals (4-6 a day counting snacks) • Cook all meats to well-done • Wash and peel all fruits and vegetables • Eat a variety of foods from all food groups • Take a multi-vitamin supplement

Activity	Precaution
Cleaning	• Use a 1:10 bleach/water solution for cleaning (will kill most all organisms), avoid "disinfectant" cleaners • Discard solution within 24 hours of mixing (is not affective after 24 hours), make only the amount needed each day • Put this solution on any thing that gets HIV+ blood or other body fluids on it • Use bleach in laundry with blood or body fluids • Use double plastic bags to throw away disposable items exposed to blood or other bodily fluids • Change air-conditioner filter every year
Pet Care	• When ever possible, should be avoided by HIV+ individuals • When unavoidable, wear gloves and wash hands carefully when finished
Follow-up Care	• Establish a relationship with health care providers • Contact provider the same day any of the following signs are noticed: 1. skin lesions or bruising 2. rashes or lumps on skin 3. swollen lymph nodes 4. sores or bumps in mouth 5. fever over 24 hours 6. extreme fatigue even when getting lots of rest 7. weight loss 8. diarrhea or constipation 9. shortness of breath 10. persistent coughing 11. headache or dizziness 12. sensitivity to light 13. dizziness 14. forgetfulness 15. unusual bleeding (nose, gums, skin, etc.)
Sexual Practices	• Practice safer-sex in all situations

Activity	Precaution
Procreation	• Always use contraception if pregnancy is unwanted
IV Drug Use	• Avoid sharing drug paraphernalia (even between HIV+ individuals, avoid re-infection) • Disinfect paraphernalia if sharing will occur (use 1:10 bleach/water solution)
Stress Management	• Join support groups • Get professional assistance • Use meditation, message, therapeutic touch or other relaxation techniques • Find a reliable source of getting HIV related information
Other	• Use own personal items such as razor, toothbrush, or make-up • Refrain from donating blood or organs • Give serious consideration to who needs to know + status and how to share the information

APPENDIX G

Chart of Common HIV Disorders

Common HIV disorders	Cause	Symptoms	Comments
AIDS dementia syndrome (see HIV encephalopathy)			
Candidiasis (thrush) - AIDS diagnosing only when affecting the esophagus, bronchi, trachea, or lungs. # 8 OI	Fungus. Non-contagious.	A quick-growing fungus appearing in the mouth, esophagus, lungs. bronchi, trachea, pharynx, oral and vaginal mucosa, skin, and gastrointestinal tract. Mouth: white coating in the mouth. Vagina: burning, itching, white discharge and coating, odor, redness, pain during intercourse. Esophagus: pain, difficulty swallowing.	Can appear wherever the skin or mucous membrane is damaged, including IV therapy and pressure-monitoring sites. Only an AIDS-diagnosing disease when it affects the esophagus, bronchi, trachea, or lungs. Can cause pain and wasting when it interferes with eating and swallowing.
Chlamydia * female	Sexually transmitted disease.	Women usually remain symptom-free while underlying pelvic damage occurs. If left untreated, pain, fever, miscarriage, and infertility can occur.	There is a long Asymptomatic phase, so multiple testing in GYN exams is strongly advised.
Chronic vaginitis (vaginal yeast infections, vaginal thrush) * female	Fungus.	Burning, itching, white discharge, coatings, distinctive odor, redness, pain during intercourse.	Avoid bread (yeast), alcohol, dairy foods, and sugar.

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Chart of Common HIV Disorders

Common HIV disorders	Cause	Symptoms	Comments
CMV (see Cytomegalovirus)			
Coccidiomycosis (disseminated or extra-pulmonary)	Fungus.	Nonspecific symptoms: malaise, weight loss, fatigue, cough.	Mostly infects the lungs, but in an advanced form the disease can affect the kidneys, spleen, lymph nodes, brain, and thyroid gland.
Cryptococcosis, extra- palmonary (Cryptococcocal meningitis) # 7 OI	Fungus.	Most commonly affects the brain. Also affects lungs and other organs. In lungs, can cause a form of pneumonia mimicking or occurring with PCP. Mental confusion, intermittent low-grade fevers, progressive weakness, fatigue, headache, nausea, vomiting, meningeal signs (double vision; stiff neck), memory loss, altered mental state, seizures (rare).	Often in soil contaminated with bird excrement. It is usually acquired by inhalation.
Cryptosporidiosis, chronic intestinal # 12 OI	Parasite.	Severe diarrhea with frequent watery stools, abdominal cramping, nausea, vomiting, flatulence, weight loss, loss of appetite, constipation, dehydration, electrolyte imbalances, malaise, fever.	It is possible to be infected but be asymptomatic.

APPENDIX G

Chart of Common HIV Disorders

Common HIV disorders	Cause	Symptoms	Comments
Cytomegalovirus disease (CMV), cytomegalovirus retinitis # 6 OI	A herpes virus found in saliva, semen, cervical secretions, urine, feces, blood, and breast milk.	General: fever, profound tiredness, muscle and joint aches, night sweats. Retinitis (eyes): blurry eyesight leading to blindness, floating spots, loss of peripheral vision, blind spots. Esophagus (throat): pain, difficulty swallowing, ulceration. Colitis (colon): fever, diarrhea, abdominal pain, wasting pneumonia (rare); see PCP for symptoms. Liver: hepatitis.	Some terminology: In eyes- CMV retinitis. In colon - CMV colitis. In lungs - CMV pneumonia. In brain - CMV encephalopathy. This is one of the most commonly diagnosed underlying conditions that is a cofactor in HIV progression. CMV and other herpes viruses may be responsible for a significant amount of damage to the immune system well before those viruses are recognized or diagnosed. Using Zovirax is recommended for prevention.
Dementia complex (see HIV encephalopathy)			
Genital warts (see human papillomavirus)			
Hairy leukoplakia # 13 OI	Unknown viral agent. Non-contagious	White patches in the mouth, usually on the tongue.	Can be confused with thrush, which has a similar appearance in the mouth. However, thrush can usually be brushed off the tongue, while hairy leukoplakia cannot. The treatments for thrush and hairy leukoplakia are very different.

APPENDIX G

Chart of Common HIV Disorders

Common HIV disorders	Cause	Symptoms	Comments
Herpes simplex, chronic ulcers # 9 OI	Virus: herpes simplex virus (HSV). Contagious when a sore is present.	Non-healing blisters lasting more than one month on skin, especially around the anus, genitals, or mouth. Lesions are painful; can burn and itch.	Lesions may be internal. In women, a careful GYN exam is recommended. Herpes is a definite cofactor in activating HIV infection. Diagnosis and preventative treatment is recommended.
Herpes zoster (shingles) # 9 OI	Varicella-zoster virus (VZV) the chickenpox virus. Contagious if exposed to oozing sores.	Blistery, painful lesions that form a cluster.	Affects the face and trunk on one side of the body. The lesions follow the paths of sensory nerves, so you can see a definite line where they stop.
Histoplasmosis # 18 OI	Fungus.	Fever, chills, muscle aches, headache, abdominal pain, weight loss, skin lesions, breathing difficulties, anemia, swollen lymph nodes.	Can be difficult to diagnose.
HIV-associated dementia (HAD) (see HIV encephalopathy)			

APPENDIX G

Chart of Common HIV Disorders

Common HIV disorders	Cause	Symptoms	Comments
HIV encephalopathy (dementia, dementia complex, AIDS dementia syndrome, HIV-associated dementia [HAD]) # 11 OI	HIV in the brain.	Neurological problems, including decreased concentration, slowed thought, loss of interest, slowed motor movements. Balance, memory problems, slurred speech; personality changes. In children, loss of developmental milestones.	HIV+ children are frequently affected. Peptide I shows signs of resolving this condition.
Hodgkin's disease (see Lymphomas)			
HPV (see human Papillomavirus)			
Human papillomavirus (HPV), genital warts # 15 OI	Virus transmitted through sexual contact.	Warts in genital area, including vagina, vulva, cervix, penis, outer anus, and anal canal.	Extremely common in HIV+ women.
Idiopathic Thrombocytopenia Purpura (ITP)	Unknown. Completely non-contagious.	Excessive bleeding from nosebleeds, injuries, or cuts. Some people bruise easily.	Regular platelet should diagnose ITP early. It is important to treat this disorder early.

APPENDIX G

Chart of Common HIV Disorders

Common HIV disorders	Cause	Symptoms	Comments
Isosporiasis, chronic intestinal	Protozoan.	Watery diarrhea (non-inflammatory), abdominal pain and cramps, vomiting, anorexia, weight loss, fever, weakness. Indistinguishable from symptoms of cryptosporidiosis.	Most commonly found in tropical and subtropical climates.
ITP (see idiopathic thrombocytopenia)			
Kaposi's sarcoma (KS) # 2 OI	A cancer. Possibly a contagious viral or bacterial sexually transmitted disease.	Purple, reddish, or brown, usually nonsymmetrical lesions on external or internal organs, sometimes accompanies by edema. Lesions mostly involve the skin, but often involve lymph nodes, oral cavity, gastrointestinal tract, and lungs. Pulmonary involvement can cause severe respiratory symptoms.	Usually not life-threatening, KS is the most commonly diagnosed cancer in HIV-infected people.
KS (see Kaposi's sarcoma)			
Low-platelet count, HIV related (see idiopathic thrombocytopenia purpura)			

APPENDIX G

Chart of Common HIV Disorders

Common HIV disorders	Cause	Symptoms	Comments
Lymphomas (Primary brain/spinal chord lymphoma, systemic non-Hodgkin's lymphoma, Hodgkin's disease) **# 17 OI**	Lymphoma is sixty times more common in AIDS patients than in immune competent individuals.	CNS: paralysis of one side of the body, loss of ability to speak or understand language, confusion, memory loss, seizures, apathy, lethargy; in some cases a headache is the only symptom.	On MRI and CAT scans, the lesions of primary lymphoma in the brain can be confused with those of toxoplasmosis of the brain. Both single and multiple lesions are seen. Primary lymphoma in the brain is usually a late complication of AIDS and difficult to treat.
MAC (see Mycobacterium avium complex) **# 5 OI**			
MAI (see Mycobacterium avium complex) **# 5 OI**			
Meningitis Cryptococcocal (see Cryptococcosis)			

APPENDIX G

Chart of Common HIV Disorders

Common HIV disorders	Cause	Symptoms	Comments
M. tuberculosis, disseminated or extra-pulmonary # 4 OI	Mycrobacterial infections. Contagious, but only during a two-week period and before treatments are begun.	Fever, cough, spitting up blood, night sweats, weight loss, fatigue, swollen lymph nodes. Symptoms resemble those of PCP.	Among HIV+'s, at least half the TB cases involve sites outside the lungs. The central nervous system and lymphatic systems are often involved.
Mycobactgerium avium complex (MAC), Mycobacterium intracellular (MAI) # 5 OI	A mycobacterium found in soil, water, animals, eggs, unpasturized dairy products, and other food. Non-communicable.	Persistent fever, weakness, night sweats, anorexia, weight loss, dizziness, nausea, abdominal pain, diarrhea, flu-like symptoms, shortness of breath, possible cough. Enlarged lymph nodes, frequently on one side, enlarged liver and spleen, soft tissue masses (particularly in thighs).	Can involve almost any organ system, but contamination is usually through the lungs or gastrointestinal tract. This condition may begin as a lung infection and then move to other organs, including the blood and bone marrow. Usually affects people with T4 cells below 70. This is a common underlying OI for which prophylaxis is important. The terms MAC and MAI are used interchangeably.
Mycobacterium intracellular (see Mycobacterium avium complex) # 5 OI			

APPENDIX G

Chart of Common HIV Disorders

Common HIV disorders	Cause	Symptoms	Comments
Neuropathy	HIV causes this condition. It can be the result of drug toxicity's; ddC and ddI. Non-contagious.	Pain, tingling, numbness in feet and legs, sometimes hands and fingers. Pain may be severe and walking difficult.	Neuropathy may be a side affect of a current treatment. Peptide T is currently the best treatment for neuropathy.
PCP (see *Pneumocystis carinii)*			
Penicillin-resistant gonorrhea (PPNG) * female	Sexually transmitted disease.	Burning when urinating; discharge.	Penicillin-resistant but treatable. This is another infection that can remain undetected, putting undue stress on the immune system. Treat aggressively and eliminate.
Peripheral neuropathy (see neuropathy **# 16 OI**			
PML (see Progressive multifocal leukoencephalopathy)			

APPENDIX G

Chart of Common HIV Disorders

Common HIV disorders	Cause	Symptoms	Comments
***Pneumocystis carinii* pneumonia**, (PCP) # 1 OI	Protozoan parasite.	Dry cough, shortness of breath, difficulty breathing, fever, night sweats, weight loss, fatigue, chest pain, sputum production in late disease.	This is the most commonly diagnosed AIDS OI. Is found in air, water, and soil and is carried by domestic animals and rodents, and may be latent. Primary site of disease is lungs, but infection sometimes spreads to spleen, lymph nodes, and blood and, rarely, to the bone marrow and liver.
PPNG (See Penicillin-resistant gonorrhea) * female			
Primary brain/spinal chord lymphoma (see Lymphomas)			
Progressive multifocal leukoencephalopathy (PML)	Virus, JC virus.	Memory loss, motor-control problems, seizures, mood changes, neurological symptoms and signs (e.g.,, weakness of one limb or one side of the body, loss of vision on one side, loss of feeling on one side or in one limb, language problems, unsteadiness).	Profound dementia can result from advanced disease.
Retinitis Cytomegalovirus (see Cytomegalovirus)			

APPENDIX G

Chart of Common HIV Disorders

Common HIV disorders	Cause	Symptoms	Comments
Salmonella septicemia, recurrent (Salmonellosis)	Bacteria. From ingestion of contaminated food and water.	Fever, chills, sweats, weight loss, diarrhea, anorexia.	Although enterocolitis is common in people with AIDS, it is not usually caused by *salmonella*.
Shingles (see herpes zoster)			
Syphilis (latent or recurrent) **# 14 OI**	Bacterium. Sexually transmitted.	In primary syphilis there may be no symptoms. Chancre sores or lesions are the most common early symptoms.	Most common in HIV+ women.
Syphilis (latent or recurrent) * female **# 14 OI**	Spirochetal bacterium. Sexually transmitted disease and can be prevented with a condom.	Primary syphilis can often be symptom-free except for a chancre sore at the site of infection. Symptoms for secondary syphilis can include rash, lymphadenopathy (swollen nodes, also common in general HIV infection), fevers, diarrhea, and other constitutional symptoms. Latent syphilis can affect organs.	Treat aggressively. Often, hospitalization for intravenous antibiotic is treatment of choice. Check titer regularly, since syphilis can recur and titer can rise. Aggressive intravenous antibiotic treatment is the most successful.
Systemic non-Hodgkin's lymphoma (see Lymphomas)			

Chart of Common HIV Disorders

Common HIV disorders	Cause	Symptoms	Comments
Thrush (see Candidia)			
Toxoplasmosis of the brain **# 3 OI**	Protozoan. Passed by contact with infected cats and ingestion of raw or undercooked meat or unpasteurized dairy products. Non-contagious.	Produces lesions in the central nervous system, so symptoms are neurological: headaches, fever, chills, motor changes, lethargy, confusion, seizures, paralysis on one side of the body, delusions, sensory loss, tremor, palsy, blindness, personality changes, disorientation, coma. Heart and lung symptoms are also possible.	The organism accounts for the most widespread latent central-nervous-system infection in the world. The antibody test is not definitive.
Tuberculosis, pulmonary (TB in the lungs) **# 4 OI**	*Mycobacterium tuberculosis*. TB is contagious. Non-contagious several days after treatment begins.	Cough, bloody sputum, shortness of breath, fever, weight loss, chest pain, fatigue, night sweats.	PPD skin test must be done. A sputum and/or X-ray is necessary. The mycobacterium is present in sputum droplets, released into the air by coughing. Poor air circulation can increase chances of exposure. For HIV+'s, the chances of active infection are much higher. Long-term exposure via roommates holds the greatest risk.
Vaginal thrush (see chronic vaginitis)			

APPENDIX G

Chart of Common HIV Disorders

Common HIV disorders	Cause	Symptoms	Comments
Vaginal warts (see human papillomavirus, HPV) * female	Virus. Sexually transmitted.	Warts can be seen and felt if external; if internal, requires examination.	Women with HPV must have regular Pap smears, since HPV has been linked with cervical cancer. In one study, 26% of HIV-infected women had HPV.
Vaginal yeast infections (see chronic vaginitis)			
Wasting syndrome **# 10 OI**	Usually due to poor absorption.	Profound involuntary weight loss, inability to absorb nutrients, chronic diarrhea, fever, weakness.	This diagnosis is given when other types of infection that could cause weight loss have been ruled out. Chronic weight loss can have a number of primary causes: malnourishment - which can contribute to immune suppression - changes in metabolism, the inability to absorb nutrients, diarrhea, and reduced food intake. The latter, in turn, can result from lack of appetite, oral ulceration and lesions, and drug side affects.

My client told me she feels very secure when I escort her to the clinic, and she feels protected when I visit her at home. Client's trust my new medical knowledge.

Milagros Vazquez
Case Manager Assistant
Congreso de Latinos Unidos

APPENDIX H

Signs and Symptoms of AIDS Related Diseases

Symptom	Possible Cause
• **fever** • **malaise** • **weight loss** • **myalgias** • **lymphadenopathy**	• HIV infection • CMV infection • disseminated MAI • EBV • lymphoma
• **shortness of breath** • **cough** • **fever** • **dyspnea** • **chest tightness** • **discomfort**	• Pneumocystis carinii pneumonia • CMV pneumonitis • interstitial pneumonitis • pulmonary Karposi' sarcoma
• **mouth pain** • **difficulty swallowing** • **"funny" taste to food** - without retrosternal burning - with retrosternal burning	• oral candidiasis • oral KS lesions • oral HSV lesions • esophageal candida
• **abdominal discomfort** • **diarrhea** • **weight loss**	• cryptosporidiosis • isosporiasis • CMV colitis • Giardia, amoebae • KS of GI tract • HIV infection • lymphoma
• **headache** • **disorientation** • **personality changes** • **apathy** • **confusion** • **seizures**	• toxoplasmosis • cryptococcosis • CMV encephalitis • progressive multifocal leukoencephalopathy • lymphoma • HIV infection • psychosis/depression
• **skin lesions**	• Kaposi's sarcoma • herpes simplex • varicella-zoster • cryptococcal disease • mycobacterial disease • secondary syphilis

My client told me she feels very secure when I escort her to the clinic, and she feels protected when I visit her at home. Client's trust my new medical knowledge.

Milagros Vazquez
Case Manager Assistant
Congreso de Latinos Unidos

Solutions to Nutritional Problems Common to AIDS

Problem	Eating Tips	Suggested Foods
Diarrhea	• Drink lots of liquids to avoid dehydration • Eat small amounts of food every few hours • **Do Not** skip meals • Try eating foods and fluids at room temperature • For **sudden-onset** diarrhea eat foods high in potassium • For **ongoing diarrhea**, avoid high-fiber, greasy, fried and fatty foods • For **severe ongoing** diarrhea, IV nutrition (TPN or total parenteral nutrition) may be required to maintain nutritional well-being • Dairy foods cause diarrhea in some individuals, consult doctor and/or dietitian for more information on lactose intolerance and lactose-free products	• To **prevent dehydration:** drink at least 8 or more glasses of fluids daily • To **replace potassium**: eat bananas, potatoes, and fish • To **help stop diarrhea**: eat plain rice, cream of wheat, toasted white bread, plain macaroni or noodles, boiled eggs, oatmeal, ice cream (room temp), Jell-O, applesauce, canned fruit, mashed potatoes, yogurt, and plain crackers • **Avoid eating:** spicy foods, raw fruits and vegetables, whole wheat breads corn, nuts, doughnuts, fried potatoes, chips, bacon, sausage, gravy, bologna, hot dogs, all fried meat, chili, pizza, and hot sauces • With **gas or cramping**: avoid dried or canned beans, cabbage, broccoli, cauliflower, carbonated beverages, or beer
Difficult/painful swallowing, or painful chewing	• Try blenderized food high in protein and calories • Drink liquid food supplements • Moisten foods with gravy, butter, and cream sauce • Avoid very hot foods • Talk with doctor about topical pain relief • Use a straw or drink blenderized food from a cup rather than using a spoon	• **Try eating** soft foods: mashed potatoes, eggs, omelets with cheese, custards, cooked cereals, yogurt, cottage cheese, flaked fish, ground meat, casseroles, tuna or egg salad, milk shakes, baby food • **Avoid eating or drinking**: soda bubbles, spices, salt, rough food, raw vegetables and fruit (especially oranges, grapefruits, tomatoes, and their juices), and sticky dry foods like peanut butter

Solutions to Nutritional Problems Common to AIDS

Problem	Eating Tips	Suggested Foods
Dry mouth	• Drink mild fluids throughout the day • Suck on hard candy, especially sour candy • Moisten foods with gravy, creamy sauce, milk, or juice • Talk with doctor or dentist about prescribing artificial saliva	• **Try eating:** soup, casseroles, stew, oatmeal, soft cereals, yogurt, pudding, applesauce and similar moist foods • **Avoid eating:** crackers, toast, cookies, and other dry foods
Fatigue, or too tired to prepare food	• Keep snacks close by, use a cooler if needed • Prepare simple meals • Try take-out foods • Eat canned foods, frozen food, and TV dinners • When feeling good, cook extra quantity and freeze • Utilize energy saving appliances such as blender, food processor, microwave, toaster oven • Use disposable dishes to conserve energy for eating	• **Foods to keep on hand:** shelled nuts, hard boiled eggs, cooked and chopped meats, peanut butter, canned cream soup, fully cooked and canned ham, tuna, salmon, turkey, and chicken, stew, spaghetti, pork & beans, chili; boxed hot & cold cereal, rice, instant mashed potatoes, noodle dishes; frozen dinners, fish sticks, and pizza
Loss of appetite, or feeling full quickly	• Precede meals with relaxation techniques. • Take small and frequent meals, dense in protein and calories • Eat small frequent meals (eat something 5-10 times a day) • Talk with doctor about an appetite stimulant • Avoid liquids before eating • Change meal-time environment: add flowers, add a colored table cloth, eat with someone else, play favorite music, read funny story or interesting book during meal	

Solutions to Nutritional Problems Common to AIDS

Problem	Eating Tips	Suggested Foods
Nausea/Vomiting	• Do not skip eating • Eat and drink slowly and frequent small amounts (every • 2-3 hours) • Take in as much fluid as possible, preferably fluids with calories • Eat salty foods, avoid very sweet foods • Avoid greasy, spicy, or strong smelling foods • Open a window when cooking foods with strong aroma • Try eating crackers, upon awakening, before getting out of bed in the morning • Rest after meals, but do not lay flat for 2 hours • Talk with doctor about anti-nausea medication • Talk with doctor about medication-caused nausea	• **Try drinking:** water, broth, apple juice, Jell-O, tea, ginger ale , and chewing ice chips • **Try eating:** crackers, dry toast, cereal, soup, rice, macaroni, noodles, yogurt, soft cooked eggs, oatmeal, bananas, canned fruit, mashed potatoes, pudding, custard, and ice cream • **Avoid eating:** fried and greasy foods, large amounts of margarine, butter, cream, and oil
Shortness of breath	• Have medical evaluation • Use an nasal oxygen canula while eating if medically appropriate • Eat small frequent meals (every 2-3 hours) • Avoid laying flat for two hours after eating	
Taste decreases	• Add additional flavors to food using spices (basil, oregano, rosemary, tarragon, and mint), ham, bacon bits, chopped onions, cheese sauces	

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Solutions to Nutritional Problems Common to AIDS

Problem	Eating Tips	Suggested Foods
Weight loss	• Increase the number of meals per day, it is best to eat 4-6 times a day • Don't count on appetite, eat even if not hungry, every 2-3 hours • Focus on eating foods high in calories and protein • **Make snacks count**, eat healthy and rich foods • Use non-fat dry milk as a protein supplement (no taste) when cooking eggs, hamburger meat, casseroles, cooked cereals, mashed potatoes, and noodles	• **Try eating and drinking:** regular milk, cheese, meat, peanut butter, milk shakes, egg nog, protein drinks, food supplements, • **To gain weight,** use these tips whenever possible: 1. Use milk instead of water for drinking and cooking 2. Add cream, sugar or honey to cereal, coffee, and tea 3. Add jelly and jam to all breads and crackers 4. Add whip cream to pies, fruit, and deserts 5. Add sugar, honey, brown sugar, and syrup to food 6. Add cheese sauce to foods 7. Add peanut butter to foods 8. Add lots of butter or margarine to food • **Snack on**: milk shakes, chocolate milk, cheese slices, buttermilk, • **Avoid taking in <u>empty calories</u>:** plain water, broth soups, high amounts of fruits and vegetables, sugar free drinks, low fat salad dressing

Attachment:

Please note that in addition to the **Medical Skills Curricula,** we have added the following:

- an outline of the **Parenting Skills Training** which includes the goals and objectives; this was the control group in the SPNS project
- an outline of the **Medical Equipment Training** which was provided by the Visiting Nurse Association of Greater Philadelphia

All of these trainings, their benefit to participants of the training, as well as the overall benefit to the clients served, are part of the SPNS Project, "Families With Homeworkers Do Better", A Refined Service Delivery Model to Increase Families' Well Being. A copy of the final SPNS report, #BRH 970164, can be obtained from the

Grants Management Branch
HIV/AIDS Bureau, HRSA
5600 Fishers Lane, Room 7A08
Rockville, MD 20857

Parenting Skills Training

(Train the Trainer (ACMs) Parent Workshop)

Rationale: Children and adolescents presently being served by The Circle of Care have complex and diverse needs that can be addressed by supporting and encouraging parents to take a more active role in their families. These needs can be served by increasing the caregivers' effectiveness within their own family through the acquisition of new parenting knowledge and skills. Based on this concept, the overall goal of this curriculum is to increase the self-esteem of parents by providing increased understanding of their children and themselves, by improving parents' communication skills and by building a new sense of self-worth in defining and stepping into their special role as the natural leaders in the family. The training skill will be conveyed via the ACM assigned to the household.

Target Audience: 4 Assistant Case Managers (ACMs) who are part of a community based family case management system. The role of the ACM in this system is to promote education, social services and emotional support to families with an HIV+ person in the household.

Location:

Time Frames: 4 hours a day, once a week for 7-8 weeks; each topic will have one class with activities and handouts. A focus group will reconvene 6 months after the training ends and evaluate curriculum and determine need for additional training.

Materials needed: To be developed by facilitator/trainer. ACMs will be asked to keep a journal which documents parenting conflicts encountered and how they intervened in these situations.

Material Outcomes: Curricula consisting of lesson plans, activities, handouts, etc., will be incorporated into a training manual for potential use. Additionally, ACMs will be asked if they are interested in putting together a "primer" for use by new ACMs; this will give them ownership into the training process.

Process: The first meeting, "Why are we here?" Workshop will include both groups of ACMs: those assigned to medically enhanced group and parenting group. After the first meeting, the groups will go to their assigned group for the duration of the training. Both groups will not be together until 6 months after the training.

Facilitator: Judy Lovin, ActionAIDS for Medically Enhanced Group, M. Dolores Vera, Project Coordinator for Parenting Group.

1."Why are we Here?"

Goal(s) of the workshop:

- To introduce participants to trainers and training goals
- To establish a level of comfort with trainers and with each other
- To review ACM roles and responsibilities
- To provide information regarding caregivers' overall need for wellness
- To evaluate present knowledge and attitudes regarding parenting and basic medical know-how

First Class - plenary type session:

All ACMs together - administrator Pre-Test

Topics: guidelines (confidentiality)
expectations of training
review of role expectations/duties
general health care of ACMs and caretakers
include: pelvic/cancer screening, BSE, STIs

The following pertains to the parenting track:

Train the Trainer Parenting Workshop

2. "Where do I stand on these issues?"

Goal(s) of the workshop:

- To increase parents' knowledge and understanding of their own parenting style, values and emotions
- To guide parents in exploring and clarifying their own values and attitudes about parenting, discipline, communication and sexuality
- To encourage parents to express their values to their children on the importance of staying in school, staying drug-and alcohol-free, and abstaining from sexual activity in order to have a positive, productive and rewarding future

Second class - Values Clarification:

Topics to include: parenting issues of
single parents, sexual orientation
discipline, control of children
support systems, child care, male involvement in parenting, sexuality (teen mothers, birth control, etc.)
communicating our values to our children
"teachable moments"
role models and mentoring

3. "My 2 year old has an attitude!"

Goals of the workshop:

- To increase parent's knowledge and understanding of human development in non-HIV and HIV children
- To increase parents' knowledge and understanding of their children's behavior, needs and feelings

Third class - Developmentally Appropriate Behavior:

Topics to include: Babies/children's developmental stages
Helping children learn (toys, T.V., routines, outings, stimulated play, with or without parent, etc.)
Gender differences in play, toys and discipline
Setting limits and childproofing house*
Developmental differences in HIV children/babies

4. "Do you want me to hurt you-boy?"

Goal(s) of the workshop:

- To teach parents communication skills that will enable them to become effective listeners and to more adequately express their ideas and feelings to their children
- To teach parents new methods of discipline that encourage children to take responsibility for the consequences of their actions
- To sensitize parents to the external pressures that affect their children's lives
- To assist parents in distinguishing between child neglect, discipline and punishment
- For the ACM to recognize her role within the family network as that of a resource, not a parent substitute/surrogate

Fourth class - Communication Techniques:

Topics to include: Positive and negative communication styles
Self-esteem issues
trust
security
*freedom (here or in setting limits?)
Problem solving
Behavior and discipline (v punishment); bring in cultural approach to discipline
Confidentiality and conflict of interest
Child abuse and neglect
Role of ACM in discipline situations; when and how to to intervene, yet sensitive to parent needs

5. "We need to talk about sex - but not now."

To assist women in defining and stepping into their special role as the health educator of the family
To assist parents in establish more positive, open, trusting and loving relationships with their children, based on the concept of mutual respect
To increase parents' knowledge and understating of human sexuality
To assist parents in using effective communication skills in order to communicate with their children about sex and sexuality

Fifth class - Caregivers as health educators:
(Bring in something about grandmothers, aunts, etc. (women) as caregivers)
Topics to include:
Comfort level with sexual anatomy/discussion
How to talk to your child/teen about sexuality
Contraception and birth control methods
Where to go for women's health and related issues
(general knowledge and referral/resources-based, not deal with medical knowledge)

6. "I need help!"

Goal(s) of workshop:
To encourage the use of support systems for parenting concerns
To introduce the concept of "quiet" time
To explore the use of respite care for stress management
To make parents aware of the importance of allowing children to find their place of significance, to feel competent and productive by accepting responsibility and sharing in family tasks and chores

Sixth class - Time Out/Behavior Modifications:
Topics to include: Support Systems - outside and inside the family network;
touch on cultural differences.
Maybe do something on stress management
Play activity for parental respite (quiet time concept)

(maybe incorporate a field trip to a respite center as an extra training class)

7. "What have we learned and how can I teach this?"

Goals of workshop,:

To evaluate knowledge and attitudes regarding parenting and medical details
To evaluate communication skills
To evaluate trainer and training (formally)
To bring closure to the training

Seventh class - Closure:

Topics to include: ACM Role in Parenting Issues (informal evaluation)
Role playing
Modeling behavior
Assertiveness v Aggressive Styles
Does someone have to be right or wrong?

Respecting the parent

Questions and Concerns not addressed in the training.
Administer Post-Test (formal evaluation)
Evaluation of parent training piece?

Possibilities:

Allison Schwartz Women's Conference in May?
Film showing of African American Parenting Styles?

Visiting Nurse Association of Greater Philadelphia

OUTLINE OF CLASSES FOR CIRCLE OF CARE

Day 1 -

A. **FEEDING TUBES** — **2.5 hours**

- o Learning about Feeding Tubes
- o Preparation and Administration of a Feeding
- o Changing the Feeding Bag
- o Medication and NG Tubes
- o Caring for a Person with an NG Tube
- o Providing Mouth Care
- o Gastrostomy Tubes
- o Common Problems
- o When to call the Doctor
- o RN Responsibilities
- o CMA Responsibilities

Equipment: Stationary Pump; Ambulatory Feeding Pump; NG Tube

B. **Intravenous Therapy** — **1.5 hours**

- o Understanding the Need for Treatment
- o Caring for the Device
- o Overview of Total Parenteral Nutrition
- o Role of the CMA

Day 2 -

C. **Oxygen Therapy** — **2.5 hours**

- o Using oxygen effectively
- o Learning about Home Oxygen systems
- o Types of delivery systems
- o Using an oxygen cannula or mask
- o Using portable oxygen equipment
- o When to call the doctor
- o Problems with Oxygen and what needs to be done
- o Role of the CMA

Equipment: Oxygen tank; oxygen concentrator

D. **Suction Equipment** — **1.5 hours**

- o Learning about suctioning
- o Suctioning equipment
- o Deep Breathing and Coughing
- o Trouble shooting tips
- o When to call the doctor
- o Role of the CMA

Day 3 -

E. **Respiratory Therapy** — **1.5 hours**

- o Nebulizers
- o Cleaning the equipment
- o Aerosol Treatment
- o Apnea Monitors
- o Equipment problems
- o When to call the MD

Equipment: Nebulizer, Apnea Monitor

F. **Update on Medications** — **2.0 Hours**

- o Protease Inhibitors
- o Storage of Medications
- o Food Interactions
- o Side Effects

Day 4 -

G. **Pediatric Hospice Program** — **4.0 Hours**

- o Issues of Death & Dying

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